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ELECTRIC RAILWAY JOURNAL

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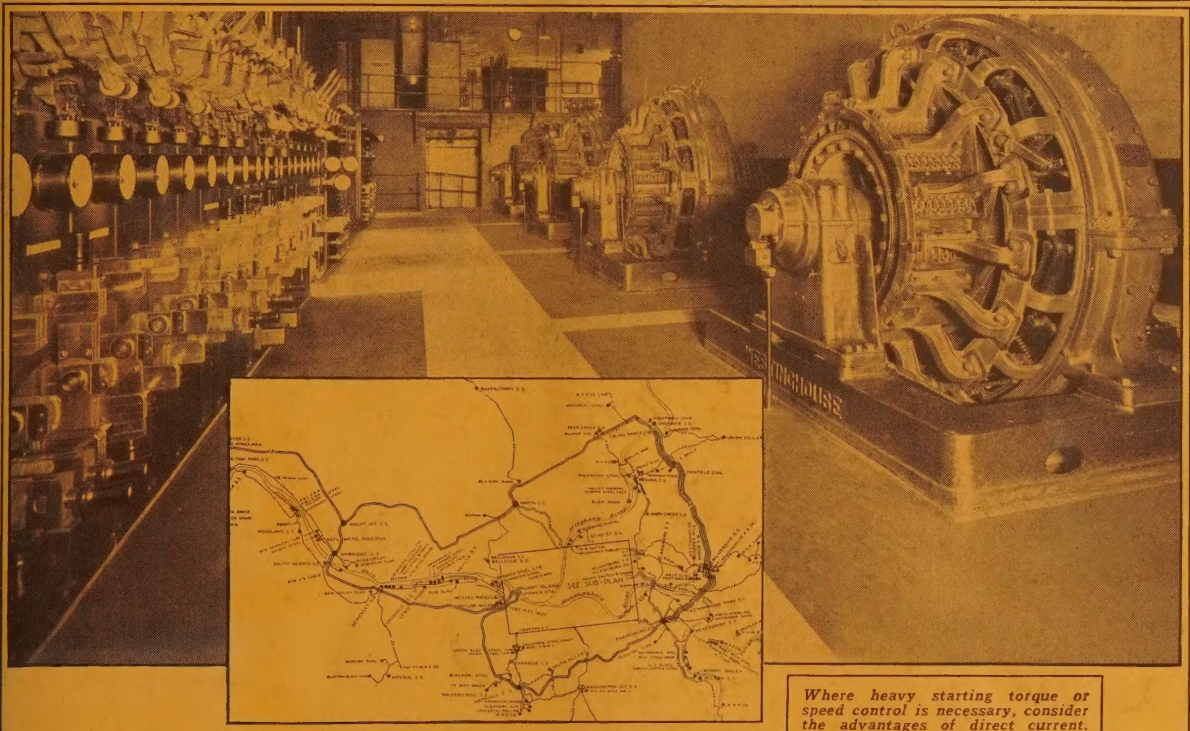

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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MORRIS BUCK, *Managing Editor*

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Wasted Government a National Menace

GOVERNMENT activities have increased greatly in the past few years. The tendency toward the injection of government in business which became general during the war has not been checked up to the present time. The able presentation of the forms of waste in government which was made by Secretary Hoover at the recent meeting of the United States Chamber of Commerce and which was abstracted in the issue of ELECTRIC RAILWAY JOURNAL for May 23, page 820, shows how far the federal government alone has gone afield in finding new activities in which to expand its efforts. Bureaus and commissions have been formed for this and that object, and the functions of existing agencies have been expanded so that all sorts of activities foreign to the original purposes of government have become a matter of course. The exposition of the subject by Mr. Hoover covered only the federal government. Every state, every city and many of the counties have likewise expanded their functions so that they too have had a similar drift from the narrow line of governmental activity.

It is high time that the swing of the pendulum be reversed. That this will be a difficult thing to bring about was indicated clearly by Mr. Hoover. It will take the combined efforts of all responsible elements in every community working together for the common cause to produce tangible results. Here is one of the great functions of the chamber in which it can be of immense value to business in general. There is no body which is so well equipped to handle a problem of this kind and no group of men so representative of the rank and file of American business as is this one. No one element in the fabric of the country will get more good out of the discussion and any results that may come from it than will the electric railways. They have been badgered by politicians, restricted in their methods of operation and financing and almost strangled with respect to fares, largely by the injection of these extraneous elements into the original function of government. For this reason every management should welcome the opportunity offered to work toward the end of a restriction of these extra governmental functions.

Spartanburg Votes to Retain Its Street Cars

JUST what is the philosophy of the people of Spartanburg, S. C., who recently refused by a two to one vote to allow the local utilities company to amend its original franchise by elimination of the clause which required the operation of street cars within the city limits? The ordinance drafted by the City Council provided that the South Carolina Gas & Electric Company be relieved of the necessity of operating street cars on condition that it remove its tracks and bear the expense of restoring the street paving. In addition the traction company was to have provided a bus transportation system.

The street car tracks have been practically in disuse for two years with the exception of one railway line. Buses have been in operation and have been giving a fairly dependable service. To all outward appearances it looked as if the bus had saved the situation and that the new management with its proposals for bus extensions had solved a problem which dates back to December, 1922, when the company abandoned several lines on the ground that they were unprofitable. Following the abandonment were discussion, disagreement and seemingly endless litigation in which the City Council, the Railroad Commission and the Supreme Court took prominent parts. Finally, in the fall of last year a new management took over the task of supplying 25,000 people with transportation service in which the bus was the principal vehicle. The controversy was over and a new era seemed to be dawning. But with the opportunity given by the City Council to the people to decide on street cars or buses because of the necessary rehabilitation program, the street car, almost a relic of the past as regards that city, came into its own again.

The reason for this attitude is not entirely obvious. Probably the public was not opposed to the new régime nor antagonistic to the methods employed. But when the issue meant tearing up the tracks the people saw the extinction of what had been an important factor in the growth of their city and they refused to sign its death warrant. They forgot the tribulations of the past few years caused by the non-functioning of these same vehicles and only remembered their pristine usefulness.

Less Unsprung Weight a Development of Importance

UNSPRUNG weight of electric railway equipment is a factor of major importance in track life and maintenance. This was emphasized by R. H. Findley of Omaha in a paper before the Mid-West Electric Railway Association, abstracted elsewhere in this issue. Unquestionably the time has arrived for careful consideration of this subject. Not only from the standpoint of track construction and maintenance costs is it important. Only when the present excessive unsprung weights which are carried on the rail are materially lowered will the problem of noise reduction be solved.

Much progress has been made already in the reduction of the total weight of electric railway equipment, and further strides in this direction may be expected. Both on city and interurban cars the universal use of lighter equipment will undoubtedly permit substantial savings both in first cost and maintenance of track. But by supporting on springs a large part of the weight which at present delivers direct hammer blows to the rail the possible savings would be materially greater than any which could reasonably be expected by mere reduction in total weight of equipment.

Furthermore it is hard to conceive of really noiseless car operation in city streets without the general use of much more flexible roadbeds than have been possible heretofore. To build track of that type, however, which will stand up reasonably under traffic it is imperative that a much larger part of the total car weight be supported on springs.

Methods by which this development will be accomplished are hard to foresee. Some thought has been given to the possibility of taking the car motors off the axles and driving through some arrangement of bevel or worm gearing, perhaps along the lines of automotive practice. When the present axle suspension and spur gear drive were adopted the design and manufacture of gearing were crude. Automotive requirements have been responsible for a remarkable improvement. The present type of railway motor drive is so simple and reliable that there is a natural reluctance to consider seriously any complication which might increase cost. However, the demand for improvement is now becoming so insistent that some form of drive to take the unsprung weight off the car axles may be expected to attract increasing attention.

Cushioning for wheels presents another possibility. This may in itself help reduce the hammer blows on the rail. Some interesting experiments in this direction are being made, From both standpoints—track cost and noise reduction—lessening of unsprung weight demands attention from manufacturers.

Mayor Hylan's Own Board Pricks Five-Cent Fare Bubble

MAYOR HYLAN'S hand-picked Board of Transportation in a report made on May 28 buried his 5-cent fare issue under a weight of evidence heavy enough to inter permanently any seeker for office on the Mayor's policies except the Mayor himself. It may be that this time he is finished, too, but no one seems to be sure about it, though every paper in New York except the Hearst sheets expresses that hope. Certainly if figures could bury a man those contained in the report just made public bury the Mayor face down.

The system on which the Mayor has set his heart would have a length of 57 route-miles, providing single-track mileage of 170 miles, not including sidings. Without any equivocation the Mayor's board says that the continuance of the 5-cent fare depends absolutely upon the method of financing. Financing entirely with 50-year bonds would necessitate an 8-cent fare plan, whether the system be operated by the city or by a corporation.

These are plain words, but they are the words of the board itself. Moreover, the board says that on a capital outlay of $542,915,000 under the 5-cent fare plan the capital could be obtained only by putting on the users not more than 40 per cent of the original cost. This would be taken care of by the issue of 50-year bonds, the interest and sinking fund of which would be paid out of e[illegible] investmen[illegible] Of the remaining 60 per cent of the origina[illegible]e city at large[illegible] 35 per cent would be contributed by th[illegible]erm serial bond[illegible]nd would be raised by the sale of short-t[illegible]e next eight yea[illegible]etired in annual installments during th[illegible]be done without a[illegible] The report declares that this can [illegible]25 per cent would[illegible]y increase in the tax rate. Finally, [illegible]be paid by the owners of property directly benefited by the improvement. In short, the board outlines a financial policy that, if adopted, will preserve a uniform 5-cent rate of fare by distributing the cost of the new rapid transit facilities "equitably upon the beneficiaries thereof."

It is all very cute, but the beneficiaries show signs of rebelling. The 5-cent fare may appeal to them in the abstract, but the prospects of a yearly visit from the tax gatherer in addition to the one he now makes does not appeal to them. Their spokesmen are up in arms. Moreover, there is grave doubt as to whether such assessments could be made so equitably as to be constitutional.

Electric Power Securities a Favorite Form of Investment

THE good market at present for the stock and other junior securities of electric power companies has incited some of the financial papers to publish striking comparisons of the prices for these securities in 1921 and at present. The figures show a very large rise in many cases, but this fact alone is no proof that the increase is unjustified. While some of the stock may seem high on the basis of present earnings, that of other companies is undoubtedly low, according to the same standard.

It is not surprising that at the present time there should be a demand for electrical stock. This country is in an electrical age. The uses of electrical power have been tremendously stimulated during the last ten years by the rise in wages during the same period. It is not only in the factory that appliances by which one person can do the work of two or three are being used. These improvements are sought also in the business office, on the farm and in the home. In each place the demand is due to the high cost of manual labor. Added to this, of course, is the higher scale of living at present and the greater purchasing power of the American people. Both of these reasons have stimulated the demand for more illumination and for all kinds of electrical appliances which add to the comfort of living.

Another factor in the increased demand for electric power securities is the growing recognition by the public and by courts of the necessity of fair rates for public servants. Still other factors are the engineering improvements and financial consolidations which have enabled these companies to serve an ever-increasing number of customers. During the war expansion to take care of this demand was difficult. Since 191[illegible] the return to normal conditions in this respect ha[illegible] brought about a large expansion in utility enterprises.

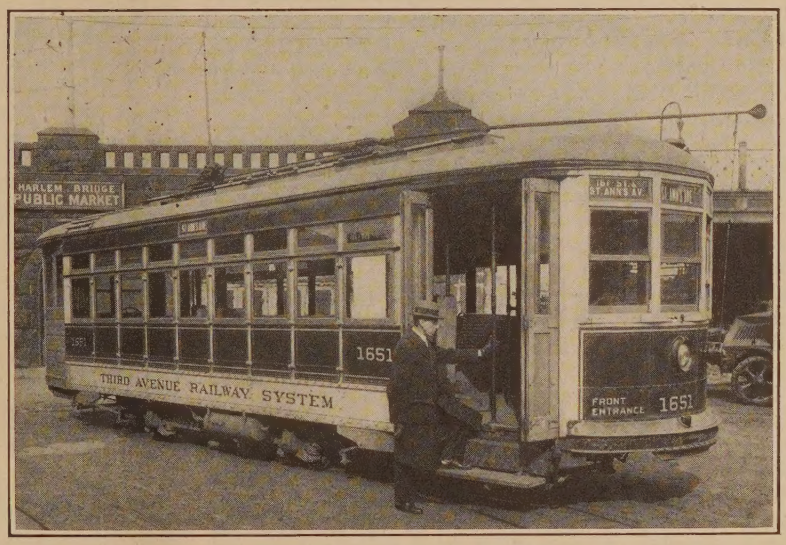
The electric railway man naturally is interested i[illegible] the effect of this situation on electric railway develop[illegible] ment. As a part of the electrical industry, electri[illegible] railways must share to some extent in this growin[illegible] popularity for electrical securities. One reason, o[illegible] course, is that a great many of the electric railway[illegible] also do a power business. Another is that much of th[illegible] pioneer work in securing adjudication on franchise an[illegible] rate questions will be undertaken by the power com[illegible] panies and its value will inure to the electric railway[illegible] Still another reason is that the engineering improv[illegible] ments stimulated by this expansion of the electr[illegible] power industry should tend to reduce the cost of energ[illegible] to railway companies which purchase power.

25,300-Lb. Single-Truck Car Seats 46

One-Man Car Built for Third Avenue Railway Has Many Distinctive Features, Including Long Wheelbase Truck, Removable Side Panels and Outside Brake Rigging —Simplified Framing Is a Major Factor in the Reduction of Weight

HIGH seating capacity combined with light weight are features of a new single-truck one-man car that recently has been built for the Third Avenue Railway, New York City. This car is of the full convertible type with removable side panels that has been used successfully for some years by this company. Seating 46 passengers, it has a length over all of 35 ft. 2½ in. and a truck wheelbase of 9 ft. 6 in. Completely equipped its weight is 25,300 lb. Other features of interest are the outside brake rigging and the flush platform design.

Included in the car order, which was awarded to the J. G. Brill Company, Philadelphia, were 49 convertible motor cars with bodies 30 ft. 4½ in. long and a single convertible car body, which is the one described, 35 ft. 2½ in. long. The construction of the latter was the same except for the extended length.



This Light-Weight Car of the Third Avenue Railway, New York City, Has a Low Step and Flush Platforms. The Side Panels Are Removable

All the car bodies were of a convertible type, the side opening being arranged so that the panels can be taken out in summer and screens substituted. The round-end vestibules have folding doors and steps at diagonal right-hand corners of the car body. The roof is of the plain arch type. An interesting feature of the longer car is the remodeling of a Brill 79-E truck so as to give a 9-ft. 6-in. wheelbase. Rolled steel wheels of 24 in. diameter are used. The weight of this car is 25,300 lb. and the seating capacity 46. This gives a weight per seat of 550 lb., which is from 75 lb. to 250 lb. less than many recent cars ordered for city service.

Framing Substantial But Light

The underframing is of steel throughout. Side sills consist of 3-in. by 3-in. by $\frac{5}{16}$-in. rolled-steel angles running continuously between the end sills. The latter, which are 4 in., 5.4-lb. steel channels, extend the full width of the car between the side sill angles to which they are securely riveted. Steel channels of the same weight are used for crossings, but they have a 2-in. by 1½-in. wood furring on the sides. Where double crossings are used at the end of elliptic springs, there is a 1-in. by 2-in. wood furring. One crossing is located directly in the center of the car body and one either side of the center, a distance of 2 ft. 11 in. from the back of the crossing. Two 4-in. rolled-steel channels are placed back to back and spaced 1 in. apart at 6 ft. 3⅞ in. from the center of the car to the center of the two crossings. This eliminates the crossings and angle wheel piece stringers used in other cars now operated by the railway.

The outside platform knees are of 7-in. 9.8-lb. channels, and diagonal braces extend from the fender to the end sill. These are of 3-in. by 3-in. by $\frac{5}{16}$-in. rolled-steel angles. Diagonal tie straps are of 2-in. by ¼-in. bars. Bumpers consist of 4-in. rolled-steel channels with their flanges turned outwardly. A section of 3-in. channel is riveted directly under the bumpers at the center, so as to form an anti-climber. A casting is installed back of this channel to receive the railway's standard drop pin.

The corner posts are of 3-in. by 3-in. by $\frac{5}{16}$-in. rolled-steel angles, and side posts are steel tees 3 in. x 1½ in. by ¼ in. These extend in one continuous piece between side-sill angles forming carlines. They are riveted at both ends. The side posts are equipped with malleable-iron brackets for fastening the removable side panels or side screens, depending on whether the car is open or inclosed.

The top window support consists of a 1½-in. by 1½-in. by $\frac{5}{16}$-in. rolled-steel tee riveted outside the posts and extending the full length of the body. The belt is a 2-in. by ⅜-in. flat steel bar. Letter-panel angles are ¾ in by ¾ in. by ⅛ in. The letter panels extend 18 in. above the upper sash. The removable side panels are straight. The two end side panels consist of No. 16 blue annealed sheet steel and are not removable. The side sheathing is of ⅛-in. blue annealed steel.

The ends of the car are inclosed with round-end vestibules having three windows. These have a $\frac{5}{16}$-in. agasote lining bent to radius. Vestibule center posts and belt rail are of ash. The corner posts are 2-in. by 2-in. by ⅛-in. rolled steel angles with an ash filler. Vestibule windows have bottom sash stationary and the upper arranged to drop. The upper sash are fitted with a rack and lock the same as the side sash in the car

body, so that they may be held at various heights. All sash are of ash glazed with double thickness glass and fitted with sash lifts. The left-hand side of the vestibule is inclosed with two fixed panels.

CONTINUOUS POSTS SUPPORT ARCH-TYPE ROOF

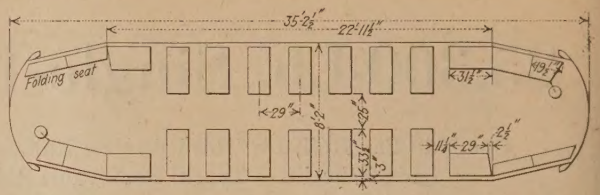
The roof is of the plain arch type and is continuous for the full length of the car body. It is made of $\frac{3}{8}$-in. agasote with wooden hoods. A covering of No. 8 canvas bedded in white lead is used. The roof is supported by the side post tees which form the carlines. The sides are of No. 16 sheet steel with flanges at both top and bottom. The bottom flange is secured to the roof and the top flange to the monitor board, which is $\frac{3}{4}$ in. thick.

A $1\frac{1}{8}$-in. yellow pine trolley board is installed on the roof above the $\frac{3}{4}$-in. monitor board, to receive two trolley bases. The monitor board serves as the top for a ventilating duct extending the full length. The duct sides are No. 16 sheet steel flanged at both top and bottom. The bottom flange is fastened to the roof and the top flange to the monitor board. Roof mats and motormen's steps are provided at diagonal corners of the car. Bulkheads are omitted, but the continuous bulkhead angle at either end is 3 in. by 3 in. by $\frac{3}{16}$ in.

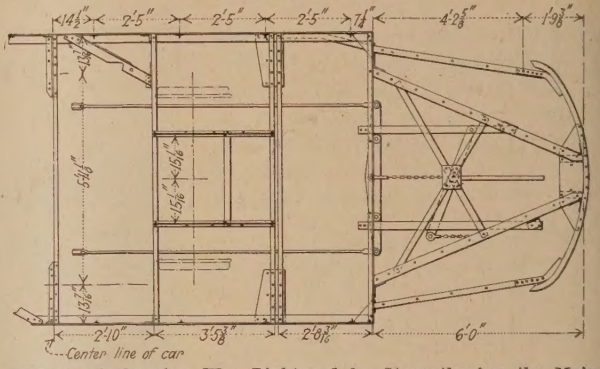
The flooring in the body and platform consists of one layer of $\frac{3}{4}$-in. yellow pine tongued and grooved. This is laid lengthwise in the body and crosswise on the platform. Floor strips are laid lengthwise in the aisle and crosswise between transverse seats. The aisle floor mat strips are of tapered maple $\frac{5}{8}$ in. wide at the bottom and $\frac{3}{4}$ in. high. The floor strips between seats are $\frac{1}{2}$ in. high. The inside finish, including all doors, sash and molding, is of ash. The ceilings have carline finish. Advertising card racks are provided on each side of the body.

The lower portions of the removable side panels are of $\frac{1}{16}$-in. agasote, while the upper portions are double thickness glass, the two being set into wooden frames. The long car has seven of these removable panels and two permanent end panels of similar design. The short car has two less removable panels. The screens which are installed in place of the side panels during the summer months are of diamond mesh wire. These are arranged to be applied with the same brackets as the side panels. The upper sash, which remain in the car, are fitted with sash fixtures and are arranged to raise. The company's standard sash lock is used on the side sash. Sash racks are pressed steel with notches.

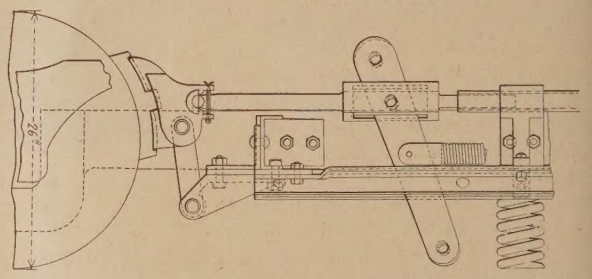
The 46-seat car has seven Brill Winner transverse seats with reversible backs on each side. The shorter cars, which seat 38, have but five cross seats. The seats have pressed-steel pedestals and the seat backs are provided with polished bronze grab handles arranged diagonally on the backs. All seats and backs are made of ash, wooden slat construction. The transverse seat panels and backs are made as light as is consistent with strength. Clips are installed on the bottom of transverse seats to prevent them from being raised from position when the passenger rises.



The Car Has a 25-In. Aisle with 33½-In. Seats. The Total Seating Capacity Is 46



Body Underframing Was Lightened by Strengthening the Main Members and Omitting Unnecessary Parts



Truck Brake Rigging Was Installed on Outside of Trucks to Provide Space in Center for Installation of Electrical Equipment

There is a longitudinal seat for two persons at each corner of the interior and on the diagonal left-hand corners of the platform. The seats on the platform extend to the dasher. A folding slat seat on each platform in front of the door opening is arranged to fold up against the car body.

The motorman's seat at each end of the car is similar to the Brill swing type, but is made much lighter. Corrugations at the bottom of the stancheon permit the

EQUIPMENT FOR FULL CONVERTIBLE CAR OF THIRD AVENUE RAILWAY

Builder of car body	J. G. Brill Co.	
Type of car	Full convertible	
Seating capacity	46	
Weight, total	25,300 lb.	
Length over all	35 ft. 2½ in.	
Truck wheelbase	9 ft. 6 in.	
Width over all	8 ft. 2 in.	
Body	All steel	
Interior trim	Ash	
Headlining	Agasote	
Roof	Arch	
Air brakes	Westinghouse (foot control)	
Armature bearings	Bronze	
Axles	3¾ in.	
Bumpers	Channels, flange outside	
Car signal system	Consolidated	
Car trimmings	Brill	
Control	K-11	
Curtain fixtures	Curtain Supply Co., Ring 88	
Curtain material	Pantasote	
Destination signs	Hunter	
Door-operating mechanism	National Pneumatic Co.	
Fare boxes	Johnson	
Wheelguards	Providence (all metal)	
Gears and pinions	Westinghouse gear, Cincinnati pinion	
Hand brakes	Peacock staffless	
Heater equipment	Consolidated	
Headlights	Dayton 8 in.	
Journal bearings	Plain	
Journal boxes	Brill	
Lightning arresters	G. E. aluminum	
Motors	Two GE-247, inside hung	
Paint	Chas. Moser & Co.	
Registers	International Type R	
Sanders	Brill Dumpit	
Sash fixtures	Edwards	
Seats	Brill Winner	
Seating material	Ash slats	
Springs	Brill	
Step treads	Kass safety	
Trolley catchers	Earll No. 7	
Trolley base	Nuttall Type 11, Form A	
Trolley wheels	G.E., Form A-40	
Trucks	Brill 70-E-2	
Ventilators	Consolidated honeycomb	
Wheels	26 in., solid steel	

seat brackets to be rotated and then held in any desired position. This provides for a changeable distance between the dasher and center of the motorman's seat.

Each side window has a pantasote curtain mounted on Rex all-metal curtain rollers. A bathtub type motorman's curtain of khaki duck is placed on each platform. This is supported on a pipe hanger. A wooden box arranged on the frieze board at the left-hand corner of the vestibule holds the curtain when it is not in use.

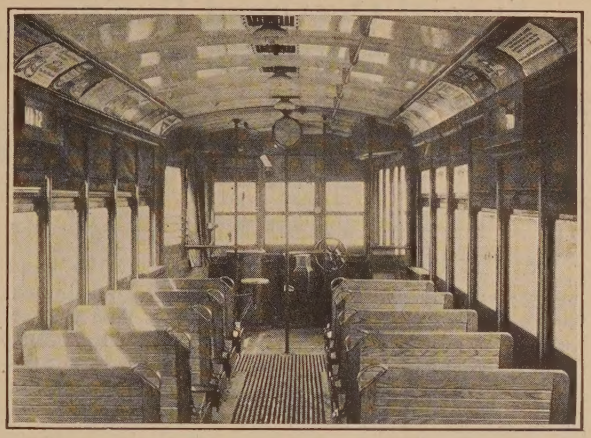
Double two-part folding doors are provided at diagonal right-hand corners of the car. One part is arranged to fold out against the body corner post, and the other to fold out against the vestibule corner posts, giving a clear opening of 4 ft. Doors are of ash, glazed in the upper portion with double thickness glass, while the lower portion is provided with agasote panels. The single folding step is the full width of the door opening. This is of 1¼-in. oak and is arranged to operate in conjunction with the folding doors by a National Pneumatic engine, located in the heading above. Each step is fitted with a 3-in. Kass safety tread.

There is a stanchion in the center and another at the right of each door opening. Additional stanchions with horizontal legs are placed at the right-hand side of the bulkhead and the left-hand side of the platform, and one with a railing reaching from the center of the bulkhead to the door opening separates incoming and outgoing passengers. All stanchions are 1-in. diameter pipe with malleable-iron fittings, enameled black. A chain with catch between the two stanchions at the center of the door opening slides into the stanchion when not in use. A drop bar is located at each doorway to slide on a vertical stanchion of the railway company's standard.

Special Trucks Were Designed

The truck construction for the longer car is of particular interest. The short car bodies are mounted on Brill No. 79-E1 trucks with 8-ft. wheelbase. For the long car this was remodeled so as to provide a 9-ft. 6-in. wheelbase with 24-in. wheels. The brake rigging is placed at the outside of the truck. This gives a space underneath for equipment approximately 4 ft. square. This simplifies the inspection of equipment. The springs of the longer truck are of heavier construction than those used with the short car bodies.

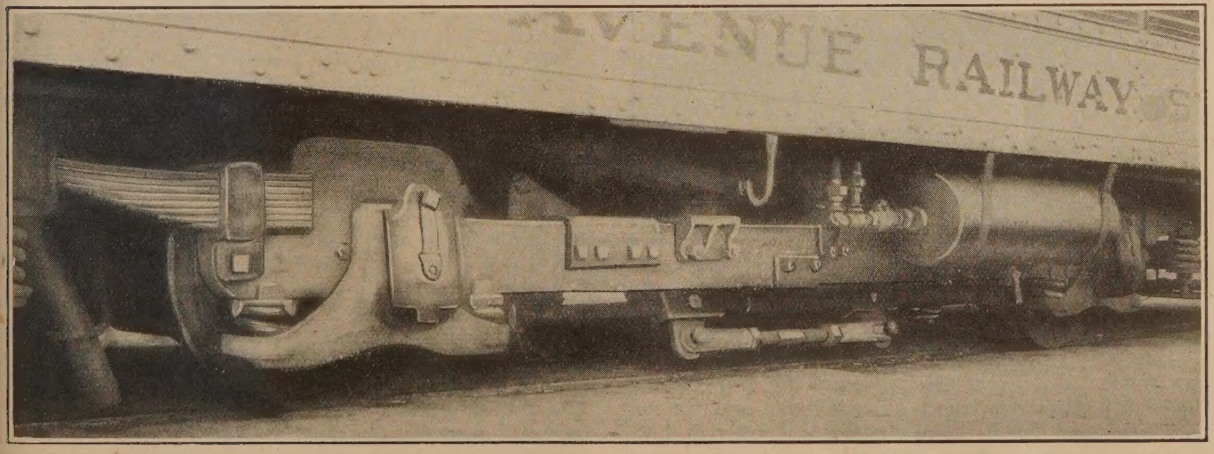
The type of equipment, dimensions and weight are given in an accompanying table. The passenger signal



Lamps Are Installed on the Ventilators and the Wiring Is in the Ventilating Duct Above the Roof

system consists of a Consolidated Car Heating Company's buzzer located on the underside of the hood at each end of the car, with a push button on each corner post. Exhaust type ventilators are used with grilles. Five of these are arranged to take light fixtures. Six Hunter destination and route signs are used on each car. One is located over each right-hand vestibule window, one over each center vestibule window, and one over each center side sash. The two signs in each end of the car are arranged for curtains 19 in. wide and the side signs for 25-in. curtains. The side sign boxes are illuminated from the car body lights and have a removable frame on the back in place of a hinged lid. By removing the frame, the curtain and mechanism can be entirely removed from the sign boxes.

Each car is provided with two Brill "Dumpit" lever-operated sand boxes complete with sand hose. The sand boxes are of galvanized iron and are located under seats at diagonal corners of the car. The lever for operating the sanders is close to the controller, so as to permit the installation of a stationary seat on the left-hand side. The electrical equipment consists of two GE-247 motors, inside hung. K-11 controllers are used, together with pedal type control interconnected with the air brakes. An alarm gong on the roof above each platform is arranged to be operated from the motorman's position by means of a hand cord.



The Truck with 9-Ft. 6-In. Wheelbase Is Arranged with the Brake Rigging Outside to Give Clearance for Equipment Beneath

Special Overhead During Grade Elimination

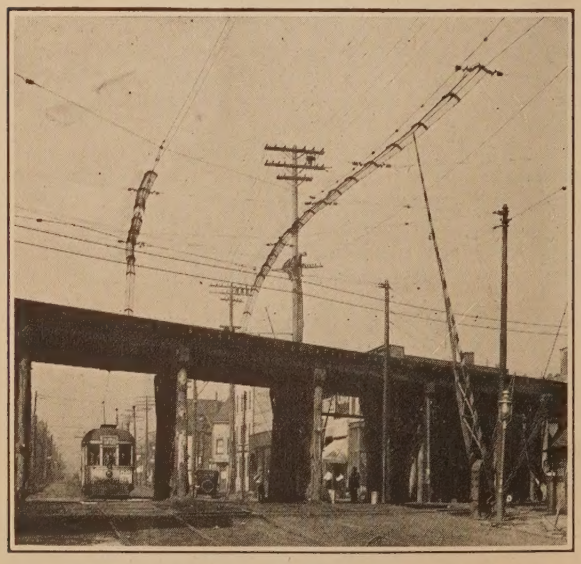
A Drop in the Trolley Wire from 22 Ft. to 15 Ft. Was Necessary on One of the Cleveland Railway Company's Lines in a Space of 6 Ft.

BY JAMES SCOTT
Superintendent of Overhead Construction Cleveland Railway, Cleveland, Ohio

GRADE-CROSSING elimination work of the Pennsylvania Railroad confronted the Cleveland Railway with an unusual problem during the past year. There were three of these crossings eliminated on the trolley lines at Woodland, Qunicy and Central Avenues. The surface railroad lines at these points originally consisted of four tracks, but during the reconstruction all steam traffic was operated over two tracks, while a trestle was constructed over the other two. The construction of trestles, the elevating of switches and spurs extended over a period of more than ten months. During this time, special overhead construction was necessary on the electric lines, which were kept in continual operation.

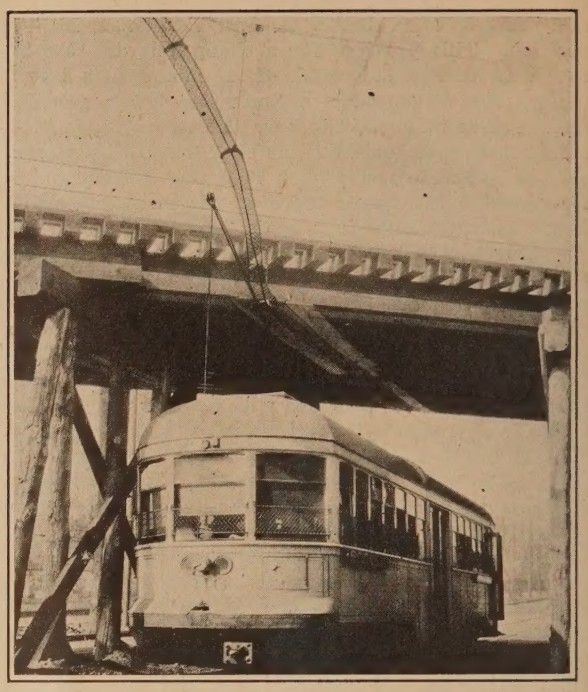
The method of reconstruction used made it necessary for the railway to maintain the trolley wire and guard at a height of 22 ft. over the two tracks which were in use for steam road traffic and then to drop to a height of about 15 ft. in order to pass under the trestle. This was particularly difficult as the trestle was but 6 ft. west of the steam line tracks. The construction used is shown in the accompanying illustrations.

One of the most difficult problems that had to be solved was to provide for the action of the trolley



Type of Overhead Construction While Temporary Trestle Was Being Used for Grade Elimination

wheel and pole while a car passed under the construction in the direction from the steam road track toward the trestle. Due to the sharp drop of the overhead and the close proximity of the trestle, the pole came in contact with the bridge before the wheel started down the incline of the trolley wire. It was, of course, most desirable to have such a construction that the wheel would not leave the wire and also so that it would not be necessary to stop the car while the conductor pulled the trolley pole down.



The Trolley Pole of Electric Cars Passing Underneath the Trestle Made Contact with a Bronze Pan, and the Trolley Wheel Was Directed Back Onto the Wire by a V Construction

Careful consideration of the problem showed that while it was not possible to prevent the trolley wheel from leaving the wire, it was possible to arrange a construction so that the wheel would be automatically replaced on the wire and at the same time keep the circuit from being broken. A bronze bridge approach pan was placed on the trestle so as to extend a few inches beyond the edge of the trough. This provided clearance for the trolley wire and pole. As the pan had a beveled edge, a roller effect was given when the pole made contact. The bridge pan was V-shaped with sides 1½ in. deep and an opening at the apex where the switch approach led onto the trolley wire. The wire was supported through the trough by means of barn hangers and was led through a groove on the top of the pan and then out by means of an ordinary switch approach.

When the trolley wheels passed from the high to the low section of the wire they followed the wire until the pole made contact with the pan. The wheels were then forced away from the wire as the car proceeded and operating current was fed through the bronze pan to the pole. As the car proceeded the pole slid along the pan until the wheel came in contact and was then directed through the V onto the trolley wire. This provided a continuous circuit for current collection and no trouble from dewirement was experienced.

Root Lifeguard Used at Grand Rapids

IN THE specifications of the Grand Rapids car built by the St. Louis Car Company, published in ELECTRIC RAILWAY JOURNAL for May 23, page 808, the lifeguards were incorrectly listed as being H. B. type. This should have been the Root all-spring steel lifeguard.

Stray Earth Currents Increased by Salt

Use of Common Salt at an Electric Railway Junction to Prevent Freezing of Track Switches so Lowered the Resistance of the Soil in the Vicinity as to Cause the Rapid Destruction of Adjacent Water and Gas Pipes by Stray Currents

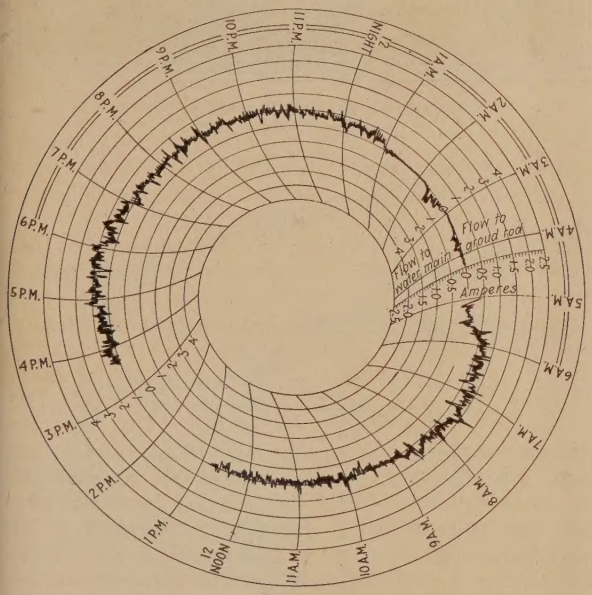
By Charles F. Meyerherm
President and Engineer Albert F. Ganz, Inc., New York City

PREVENTION of freezing of track switches by the use of common salt is a practice of many electric railways. The salt is sprinkled on the rails and about them, usually when there is snow or ice on the ground. As the snow melts the salt goes into solution and permeates the earth in the vicinity. Tests made by the author show that the salt does not reach out at once, but there is a marked tendency to lower the resistance of the leakage path for electrolytic currents through the earth.

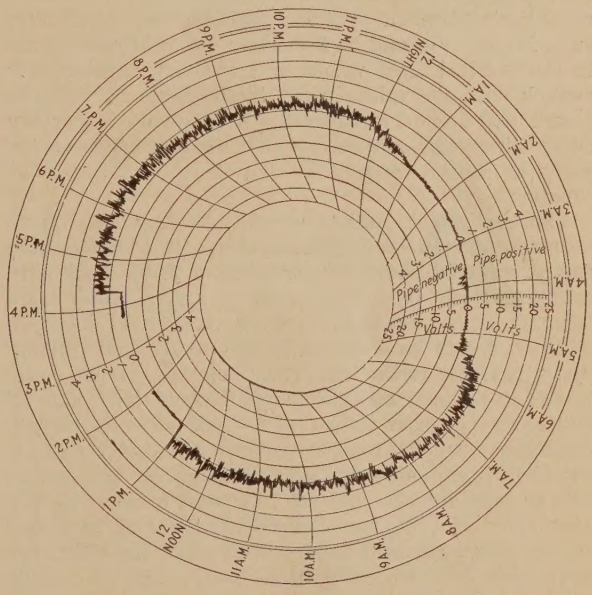
Electrolysis conditions in the vicinity of a certain interurban electric railway junction had been under observation for a number of years owing to the frequent failures of water and gas pipes. A total of thirty failures of the water service pipes supplying two adjacent buildings had occurred in twelve years' time. The gas service pipes supplying the same buildings had also been destroyed frequently, and in addition a section of a 6-in. extra heavy cast-iron branch water main crossing under the tracks in this neighborhood had failed three times due to corrosion.

The junction referred to is situated about ½ mile south of a substation which feeds this section of the interurban line. An 8-in. cast-iron water main and a 4-in. cast-iron gas main parallel the rails between the junction and the substation. Tests indicated that at the junction these pipes were at a potential some 9 volts positive to the rails and about 7 volts positive to earth. The pipes were also positive to rails throughout the entire distance between the substation and the junction. Measurements of current on the 8-in. water main indicated a loss of about 20 amp. from the water pipes in the vicinity of the junction.

While the positive potentials of pipes with respect to earth were thus very high for a considerable distance, no failures of pipes had occurred except in the neighborhood of the junction. The circumstance at once led to a suspicion that some peculiar local condition might be the chief factor. It was known that salt had been used on the track switches over a long period of years to prevent freezing. The illustration is a reproduction of a photograph taken in April, 1923, of one of these track switches. The white deposit noticeable on the ground between the rails is a crust of salt crystals remaining from the previous winter's use. That this salt should have withstood the spring thaw and rains shows the extent to which salt had been used at this switch. It was suspected that this salt had gradually seeped into the earth beneath, thus lowering the electrical resistance of the soil and hastening the corrosion of the water main, and that the successive excavations had caused further penetration.



Record Showing Current Flowing from Water Main to Temporary Ground Rod



Voltmeter Record Showing Potential of Water Main Referred to Earth

Laboratory tests were therefore made on four samples of the soil, with results as shown in the table:

VARIATION IN EARTH RESISTANCE WITH CONTENT OF SODIUM CHLORIDE

Sample No.	Per Cent of Sodium Chloride in Dried Sample	Resistivity Ohms per Centimeter-Cube
1	0.0092	21,500
2	0.0023	15,900
3	0.066	710
4	0.300	166

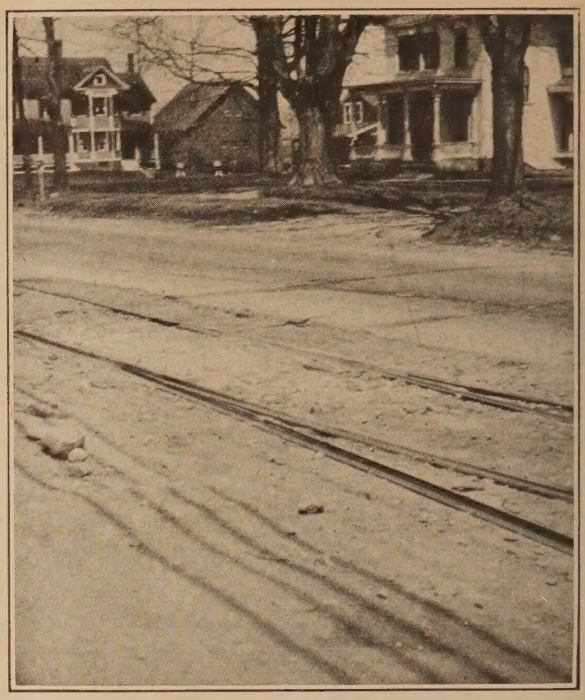
Sample No. 1 was taken from the trolley roadbed at a point some distance from track switches; sample No. 2 was taken from a field close to the track near the substation, while samples Nos. 3 and 4 were taken from the trolley roadbed near the switches in the locality where the pipe corrosion had occurred. The chemical analyses of the four samples showed them to be quite similar in general constituents except that those samples taken from under the track switches contained a very much larger proportion of sodium chloride than the samples taken at points remote from track switches. The table shows that each of the two samples containing the higher proportions of sodium chloride had a very much lower resistivity than the two samples containing the lower amounts.

To show that the low resistivity of samples Nos. 3 and 4 was caused by their comparatively large content of sodium chloride the following laboratory experiment was performed. Sufficient salt (NaCl) was added to two specimens of sample No. 1 to bring their respective sodium chloride contents up to those found in samples Nos. 3 and 4. Resistivity measurements were then made on these specimens. It was found that the addition of the salt had reduced the resistivity from 21,500 ohms per centimeter cube to 1,045 ohms per centimeter cube in one case and to 265 ohms per centimeter cube in the other. These values of resistivity agree closely enough with the values given in the table for samples Nos. 3 and 4 to be considered a satisfactory laboratory check. They indicate clearly that the salt had been the cause of the low soil resistivity encountered near the junction.

The electrolysis effects of the low-resistance earth near the junction were investigated with the McCollum earth-current meter.* The results of tests made with this instrument on a 6-in. cast-iron branch water main crossing under a track switch have been sketched in Fig. 1. It will be observed in this figure that directly under the east trolley rail (test hole No. 1) the resistivity of the soil had the comparatively low value of 660 ohms per centimeter cube. The rate of current discharge from the pipe to earth at this point was excessively high, averaging 578 milliamperes per square foot of pipe surface. About 7 ft. west of the east rail (test hole No. 2) the soil resistivity had increased to 900 ohms per centimeter cube, while the discharge rate, although still very high, had fallen off to 192 milliamperes per square foot of pipe surface. Ten feet west of the east trolley rail (test hole No. 3) the soil resistivity again increased, while the discharge rate became still lower. At a point about 30 ft. west of the east trolley rail (not shown in the figure) the soil resistivity reached the comparatively high value of 60,500 ohms per centimeter cube and the rate of current discharge from the pipe became negligible.

The foregoing measurements show clearly to what extent the soil close to the switches has been affected by the salt, since the resistivity increased rapidly with the distance away from the rails. The rates of current discharge also fell away rapidly with increase of this distance. At the last point tested the surface of the ground is several feet higher in elevation than the tracks and the soil had not been disturbed for making pipe replacements, so that the possibility of salt from the switches penetrating to the pipe was slight. The rates of current discharge found under this switch were

*The McCollum earth-current meter was described in detail in the ELECTRIC RAILWAY JOURNAL for Nov. 5, 1921.



A Crust of Salt Crystals Remaining from the Previous Winter's Use

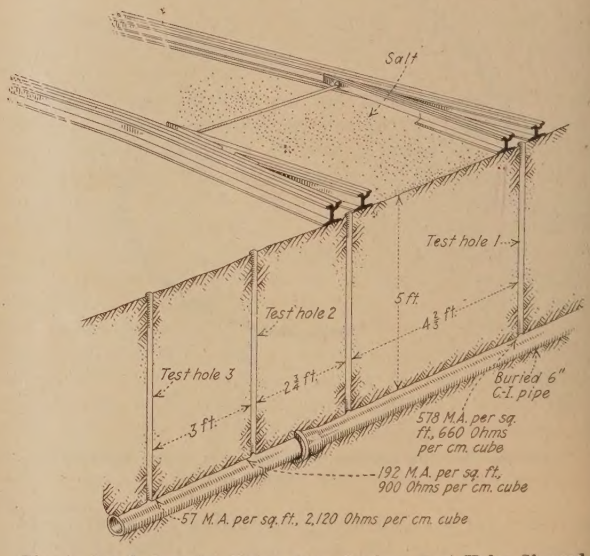

Salt
Test hole 1
5 ft.
Test hole 2
4⅔ ft.
Test hole 3
2⅓ ft.
3 ft.
Buried 6" C-I. pipe
578 M.A. per sq. ft., 660 Ohms per cm. cube
192 M.A. per sq. ft., 900 Ohms per cm. cube
57 M.A. per sq. ft., 2,120 Ohms per cm. cube

Fig. 1—Earth Samples Taken from Various Test Holes Showed Increasing Resistance as Distance from the Switch Increased

unusually high and easily account for the severe corrosion which had occurred there. Data collected by the Bureau of Standards show that material electrolytic corrosion has been found where the current discharge rate is 3 or 4 milliamperes or higher per square foot of pipe surface.

The unusually low resistance of the soil near this switch was strikingly illustrated by the following occurrence: It was found that by connecting a small copper wire between the water main and a piece of ¾-in. iron pipe driven about 2 ft. into the earth near the trolley rails a fluctuating current reaching peaks of over an ampere flowed from the pipe to the ground rod. Twenty-four-hour records of the current delivered

over this connection and also of the potential difference between the water main and this ground rod are shown reproduced in Fig. 2. The large magnitude of this current is unusual and was made possible only by the very low resistance of the earth at this point, since the contact area of the ground rod was comparatively small (0.5 sq.ft.). If driven into the normally high-resistance earth common to this region, a potential difference of 7 or 8 volts between this ground rod and earth would cause a current flow of only a few milliamperes.

Measurements of soil resistivity and current discharge were also made along the water mains at other points in the positive pipe-to-rail potential area. The results of the resistivity tests are shown in the graphic chart. The curve shows the general prevalence of relatively high-resistance soil except in the vicinity of the track switches, where it has been reduced by the salt.

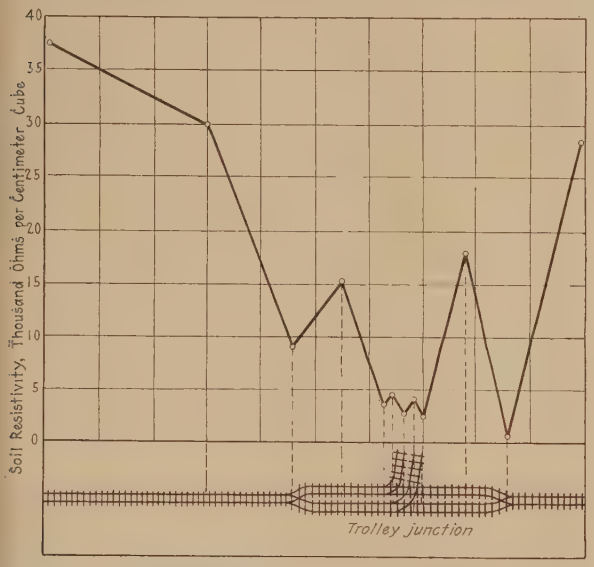


Fig. 2—Soil Resistivity in Relation to the Switch Location

The two water service pipes mentioned previously, which had so frequently required replacement, branch from the main water supply line opposite the junction and extend across the street under the switches. The earth in the ditch containing the service pipes had been kept wet by the leaking pipes and loose by the frequent excavations for repairs. The wet loose earth had allowed salt from the switch to make its way along the ditch as far as the water main, and water from the ditch making its way along the main itself carried the salt with it for some distance on either side of the service taps. It was found that near these taps the soil immediately surrounding the main had a resistivity of only about one-quarter of the value found 3 ft. above the main. The pipe at these points was discharging current to earth at average rates of from 4.6 to 67.5 milliamperes per square foot of pipe surface. Physical examination showed this section of the main to be so badly corroded that it required relaying 215 ft. of pipe.

Earth-current meter tests on the water pipes at locations where there were no switches in the track, and therefore where no salt had been used, showed a uniformly high soil resistance and only a slight discharge of current from water pipes to earth. Very little corrosion was found on the pipes at these points.

The positive potentials of the water pipes with respect to trolley rails in the section under discussion, with the present conditions of railway load and power distribution, are maintained at comparatively high values chiefly by the predominance of high-resistance earth. As a result, service pipes or branch mains which closely approach or cross under the trolley tracks in the narrow sections of low-resistance soil near the track switches are subjected to extremely destructive rates of current discharge to earth.

It is obvious that in this particular case the practice of using salt to prevent freezing of track switches has brought about a troublesome electrolysis problem in a region where, under normal conditions, there would be little tendency for electrolysis trouble to develop. The frequent and costly interruptions to water, gas and trolley service in the past, and the possibility of their recurrence in the future, would certainly justify the development by the railway of some other method than the use of salt for keeping track switches clear of ice and snow.

Use of Salt Should Be Restricted

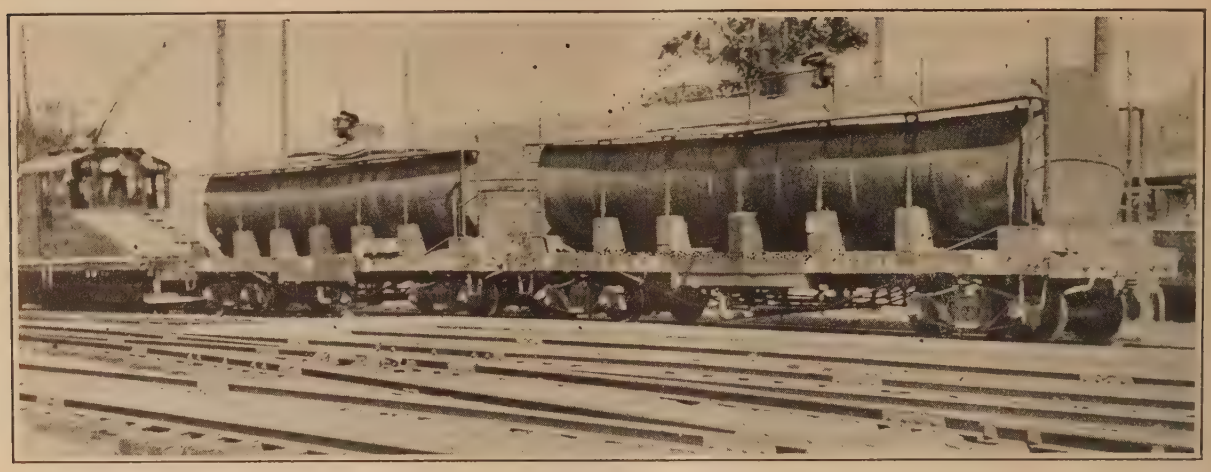
It should be pointed out that soil of high electrical resistance is one of the few natural hindrances to stray currents, and the owners of underground metallic structures should at least be able to count upon the measure of protection which this natural condition affords. For this reason the careless use of salt at track switches and special work, or any similar practice which tends to break down the soil resistance, unnecessarily increases the electrolysis hazard. The most directly harmful effects of the use of salt on the tracks are felt in the areas where the buried metallic structures are positive in potential to the rails. Objectionable effects are also present in the negative potential areas where the narrow belts of low resistance earth produced by the salt may deliver large amounts of railway current to the subsurface structures. This current may leave the structures for earth and augment corrosion in the positive areas. As in the case under discussion, conditions in a given locality may thus become aggravated to the point where the electrolysis problem is brought to a head, where otherwise the damage might have progressed at so slow a rate that the situation would not require summary attention.

These considerations seem to indicate that the use of salt at track switches and special work should be under careful supervision. Instead of being left in the hands of irresponsible track laborers, as is generally the case at present, it should be used under the direction of a responsible railway engineer, so that the quantity used, if any, could be kept at the practical minimum, and that suitable provision could be made and maintained for draining off surface water from the roadbed adjoining switches.

Capital Line Insures Employees

CO-OPERATIVE group insurance, including sickness and accident benefits as well as ordinary life insurance, has been established by the Washington, Baltimore & Annapolis Electric Railroad for its employees. This is underwritten by the Metropolitan Life Insurance Company and affects some 350 employees of the railway. Premiums are paid jointly by the workers and the company.

The total coverage amounts to about $530,000 life



Weed-Killing Tank-Car Equipment Used by the Pacific Electric Railway

insurance and the same for accidental death and dismemberment insurance. Each employee subscribing to the plan receives $1,000 life insurance and a similar amount of accidental death and dismemberment protection. Health and accident insurance provides a benefit of $10 a week for a maximum of 26 consecutive weeks.

Supplementing the usual insurance provisions of the policy, which include a total and permanent disabiilty clause, are certain service advantages, such as a free visiting nurse service and a department for the distribution of booklets and other literature on health subjects and sanitation.

Killing Weeds with Poison

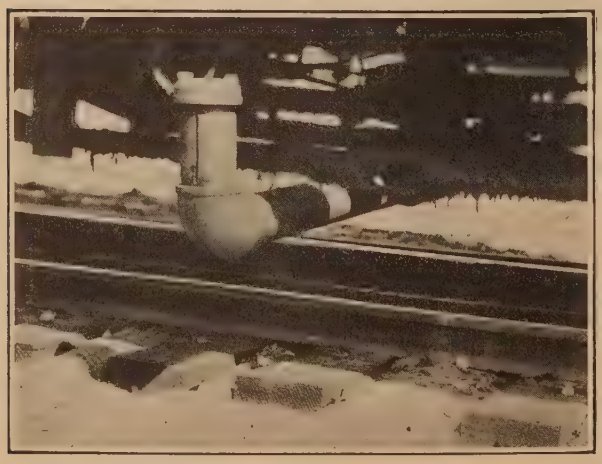
Application of Arsenite on Pacific Electric Railway Has Prevented Their Growth Along More than 1,000 Miles of Track

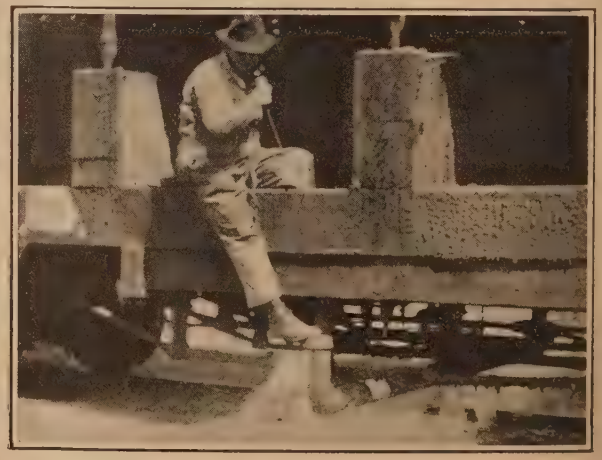
WEEDS as well as flowers flourish in the southern part of California, and one of the problems of the Pacific Electric Railway is to keep the tracks clear of such growths. Sodium arsenite, used extensively during 1923 and 1924, has been proved an efficient weed killer and is now being applied each season over 74 per cent of the 1,115 miles of track operated by the company. The magnitude of this phase of the company's operations is indicated by the expected expenditure of $51,000 for the purpose in 1925. More than 90 per cent of this sum will be for the poison and its haulage from the plant of the United States Smelting, Refining & Mining Company at Salt Lake City, Utah.

Four 12,000-gal. tank cars and one work motor car are used. A 4-in. quick-acting valve is connected to the bottom of the tank car, piping from which extends to each side, as shown in an accompanying illustration, being connected to an elbow, an 8-in. length of pipe and a cap. The elbow and piping are slotted ¼ in. for the release of the poison. The valve is controlled by rope connection. From 10 to 12 ft. of ground is sprayed beyond each rail, the apparatus covering a total width of about 30 ft. The unit travels at 15 m.p.h.

Sodium arsenite is shipped in concentrated solution form. To treat 800 miles of single track 80,000 gal. is mixed with 200,000 cu.ft. of water. The dilution is made immediately prior to use, the agitation caused by the movement of the train being sufficient to insure adequate mixing and to prevent segregation. The car is first filled with the required amount of water and the concentrated poison in another car is added by means of a 2-in. centrifugal pump, operated by a 5-hp. motor.

Despite the heavy initial expense the use of arsenite has proved economical. Weed growth is being reduced year by year, and the fire hazard has been eliminated. Application of the poison has been found to be more effective when the soil is damp.





At Left—A ¼-In. Slot Is Made in the Vertical Pipe and Elbow to Spray the Poison. At Right—The Poison Sprayer in Action

Economies in Operation Proposed for Railway in Colorado Springs

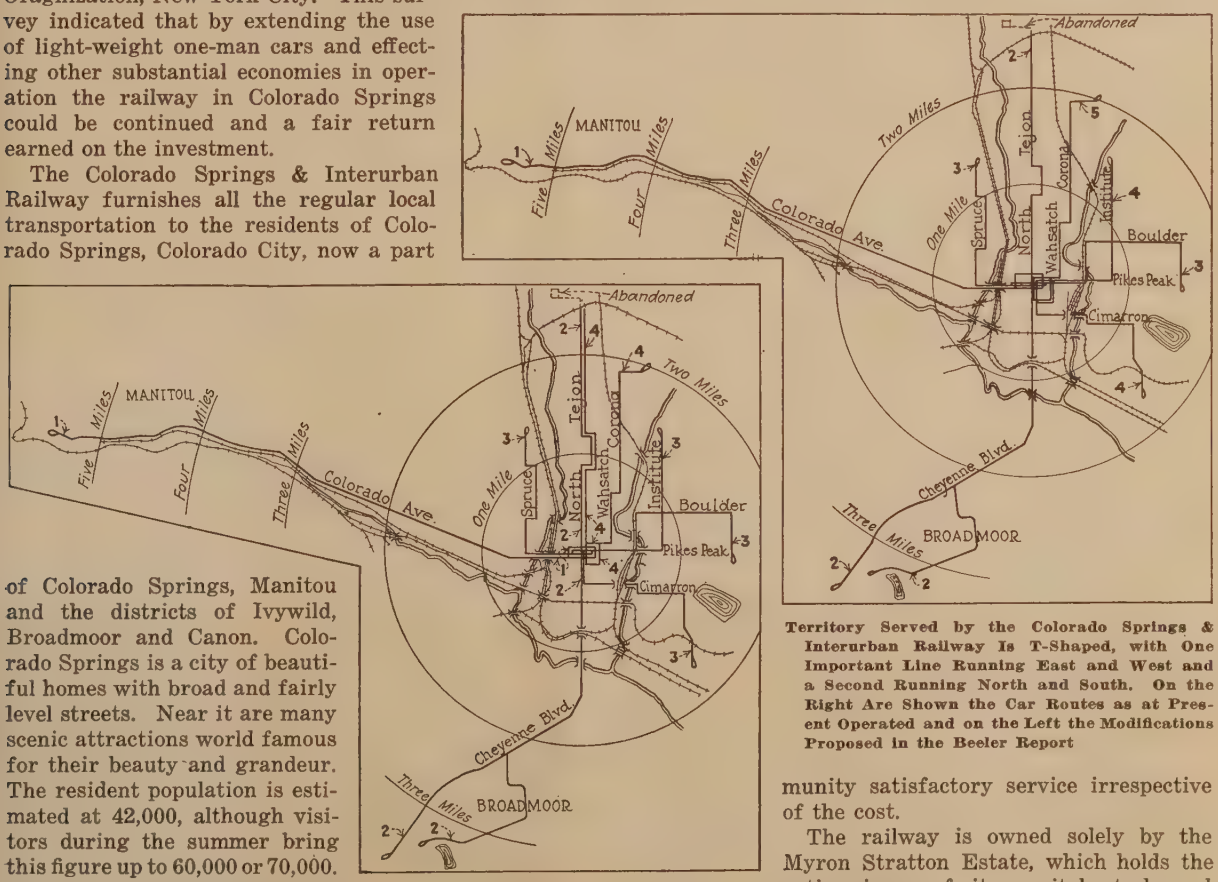
More Extensive Use of Light-Weight One-Man Cars and Relief from Excessive Tax Burdens Are Recommended in Beeler Report—New Franchise Should Provide an Adjustable Rate of Fare—Purchase of Power Would Result in Substantial Savings

FRANCHISE rights for the operation of several railway routes in Colorado Springs expire within the next twelve months. For the past eleven years the cost of service has exceeded the gross revenue and the accumulated deficit is now nearly half a million dollars. Whether or not to abandon the lines for which franchises are about to expire and what to do with the system as a whole were questions with which the owners of the property were faced. To find the best solution of this problem a survey of the entire transportation situation was made for the company by the Beeler Oragnization, New York City. This survey indicated that by extending the use of light-weight one-man cars and effecting other substantial economies in operation the railway in Colorado Springs could be continued and a fair return earned on the investment.

The Colorado Springs & Interurban Railway furnishes all the regular local transportation to the residents of Colorado Springs, Colorado City, now a part of Colorado Springs, Manitou and the districts of Ivywild, Broadmoor and Canon. Colorado Springs is a city of beautiful homes with broad and fairly level streets. Near it are many scenic attractions world famous for their beauty and grandeur. The resident population is estimated at 42,000, although visitors during the summer bring this figure up to 60,000 or 70,000. There are no large industrial establishments in the city, but on account of the mild and equable climate a number of important national and state homes have been located there.

A total of 32 cars are operated over 41.85 miles of track. Five car lines amply cover the entire community, as shown on the accompanying map. The populated area forms roughly a "T"-shaped district covering about 12 square miles. The two principal car lines are each approximately 6 miles in length and operate at right angles to each other.

Examination of the property showed that it had been maintained in first-class condition. All tracks are in excellent shape and the railway is fully equipped with modern light-weight one-man cars, all in good condition. Shops and car storage facilities are ample. The service rendered has been adequate and first class in every respect. It is apparent, the report states, that the policy of the management has been to render the community satisfactory service irrespective of the cost.



Territory Served by the Colorado Springs & Interurban Railway Is T-Shaped, with One Important Line Running East and West and a Second Running North and South. On the Right Are Shown the Car Routes as at Present Operated and on the Left the Modifications Proposed in the Beeler Report

The railway is owned solely by the Myron Stratton Estate, which holds the entire issue of its capital stock and practically all of the bonds. The proceeds of this estate are by direction of its founder to be used for the purpose of creating and maintaining the Myron Stratton Home, a large charitable institution located immediately beyond the limits of the city. The estate is managed by a board of trustees.

Results of railway operation for the years 1914 to

TABLE I—REVENUE AND EXPENSES DURING PAST ELEVEN YEARS

Year	Revenue	Operating Deductions	Fixed Charges	Deficit
1914	$421,715	$387,888	$80,000	$46,173
1915	414,962	368,031	80,000	33,069
1916	397,336	330,850	80,000	13,514
1917	396,021	337,386	79,167	20,532
1918	378,726	368,966	75,069	65,309
1919	495,370	417,525	79,354	1,509
1920	552,987	499,586	79,938	26,537
1921	536,054	506,969	75,000	45,915
1922	510,443	508,247	75,183	72,987
1923	480,881	475,471	75,000	69,590
1924	445,177	426,387	79,366	60,576
Total	$5,029,672	$4,627,306	$858,077	$455,711

TABLE II—FARE SCHEDULES EFFECTIVE 1914–1924

Date Effective	Cash Fare—Cents Adults	Cash Fare—Cents Children	No. of Tickets for One Dollar Adults	No. of Tickets for One Dollar Children	Weekly Passes
Jan. 1, '14–June 7, '19	5.0	2.5	22	..	
June 8, '19–Jan. 5, '21	6.0	3.0	18	36	
Jan. 6, '21–Mar. 18, '23	7.0	3.5	16	32	
Mar. 19, '23–June 5, '23	7.0	3.5	16	32	$0.75 to $1.75
June 6, '23–Sept. 29, '23	7.0	3.5	16	32	
Sept. 30, '23–Mar. 24, '24	7.0	3.5	16	32	$0.75 to $1.75
Mar. 25, '24–June 14, '24	7.0	3.5	16	32	
June 15, '24	10.0	5.0	..	..	$1.00 to $2.00

TABLE III—PASSENGER AUTOMOBILE REGISTRATION 1 14–1924

Year	Passenger Automobiles	Population per Passenger Automobile	Year	Passenger Automobiles	Population per Passenger Automobile
1914	1,098	32.65	1920	5,939	6.33
1915	1,568	23.02	1921	6,291	6.00
1916	2,242	16.19	1922	6,104	6.24
1917	3,195	11.40	1923	8,816	4.47
1918	3,945	9.35	1924	9,576	4.22
1919	4,870	7.65			

Note—Automobile registration for year 1924 is for ten months ended Oct. 31. The years 1920-1923 are from actual records. Prior to 1920, registration is based on proportionate registration in the United States as compiled from statistics furnished by the National Automobile Chamber of Commerce.

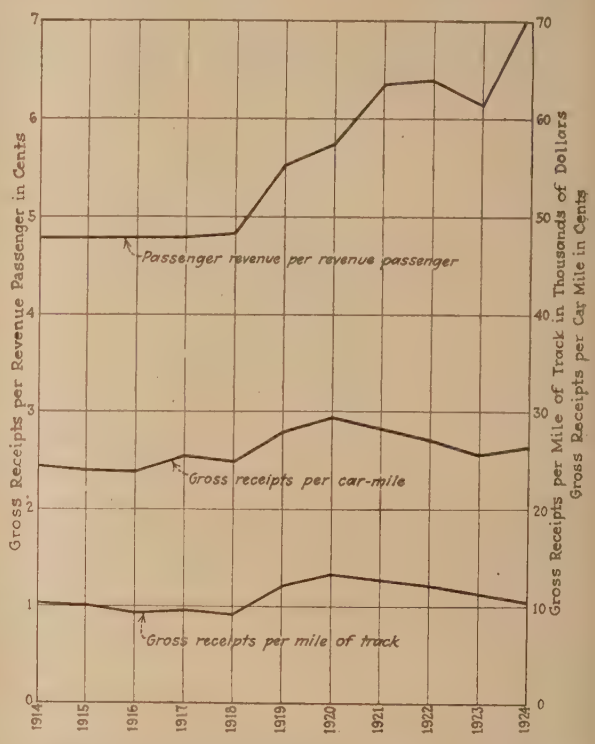
1924 inclusive are summarized in Table I. From this it will be seen that the company has not only failed to earn sufficient to pay for the cost of service rendered in any one of the eleven years but that the annual deficit accumulated up to the close of 1924 was $455,711. More than half of this deficit has been created during the past four years of operation.

Until about June 1, 1919, the company operated on a 5-cent fare. Since then local fares have been changed seven times, as shown in Table II. Results from the different rates of fare are shown graphically in an accompanying chart. Prior to 1919 the passenger receipts per revenue ride were less than 5 cents. Since then the trend has been upward, the average for 1924 being 7.11 cents. During the latter year three different schedules were in effect. The last one, which is still in effect, was established June 15, 1924, and is as follows: Adult's cash fare in each zone, 10 cents; half fare in each zone, 5 cents; weekly pass in the inner zone $1.25, weekly pass in the outer zone $1, weekly pass for both zones $2.

Inauguration of this combination schedule was followed by a loss of 27 per cent in revenue riding and brought about an actual decrease in the total passenger revenue. An analysis of the last six months of the year showed that 1,918,040 cash passengers or 63 per cent of the total revenue passengers contributed 77 per cent of the revenue at an average rate of 9.85 cents per revenue ride. Using the weekly pass 1,139,960 passengers or 37 per cent of the total contributed only 23 per cent of the revenue. These paid an average of 4.98 cents per revenue ride.

On the average the present fare schedule is yielding 8.06 cents per revenue ride. It has resulted in lowering the fare to less than 5 cents for a minority and raising it to 10 cents for the majority. A difference of 100 per cent, the report states, seems too great a variation for the cost of a ride. A more equitable solution is recommended, including a ticket rate that will be within the reach of all, in order that the majority may have the advantage of a lower rate and only the occasional rider be required to pay the maximum fare.

In order to determine the financial status of each of the various lines a thorough analysis of their revenues and expenses was made. Four so-called feeder lines failed to earn their operation costs by $33,354. The two main lines earned an operating net of $46,644, which, together with the freight earnings of $997, resulted in net earnings from operation of $14,287 available for interest. Since the survey was undertaken one feeder



Recent Fare Increases Have Increased the Revenue for Passenger Traffic, but Consequent Decreases in Traffic Have Caused a Loss in Gross Revenue

line has been abandoned. It is expected that this will reduce the annual net losses by about $4,500. The line was one that should never have been built, the report says, as the traffic survey showed that it averaged only one passenger per car-hour.

Investigation indicated that the feeder lines were earning an average of 21 cents per car-mile while the average operating costs were 26 cents. The report states that the feeder lines by themselves cannot be made self-sustaining under any rate of fare, but that the operating deficit can be reduced by certain changes in routes and schedules.

It had been suggested that the feeder line be abandoned and car service replaced with buses. At the present time this would be a mistake, the report states, because these lines are not earning enough even to cover the cost of service with modern light-weight one-man cars operating on steel rails with no interest paid on the investment. Bus operating costs would be more than these lines are capable of earning. Moreover, many miles of streets would have to be paved at con-

siderable public expense, whereas under present conditions these streets answer for all practical purposes.

A factor of great importance in the street railway situation in Colorado Springs is the tremendous growth in the use of the private automobile. The number has increased from 1,098 in 1914 to 9,576 in 1924. There is now one for every 4.22 inhabitants or more than one automobile for every family in the city. Nevertheless, until the last fare change was made the railway had retained practically 90 per cent of its traffic after ten years of this competition. Automobile registration figures by years are given in Table III on the preceding page.

Functions of the street railway and the private automobile are not identical, the report states, and one will never satisfactorily supplant the other. If twice as many private automobiles were in use as at present the need for public transportation service would be as imperative as it is now, and the railway would still be a vital and essential public necessity. Further increase in the number of automobiles will bring about new problems for those who use them. Parking space will be in greater demand. In fact, with double the number of automobiles in use, the traffic on the railway would probably be materially increased. Moreover, the automobile stimulates the riding habit and has done more to impress the public with the necessity of good transportation than has any other one thing. To those familiar with the cost of automobile transportation the railway's need for a living rate of fare is better understood and its economical advantages appreciated.

TABLE IV—PROPOSED ADJUSTABLE FARE SCHEDULE

	A	B	C	D
Adult cash fare per zone, cents	5	10	10	10
Children, cash fare per zone, cents	5	5	5	5
Ticket fare per zone, cents	..	6.25	8.33	..
Number of tickets or tokens for 25 cents	5	4	3	..

In Colorado Springs the railway is an essential and necessary public utility. Its tracks are located so as to care adequately for the present and future requirements of the community and to provide a basis for economical public transportation. Both the growth and welfare of the district socially and commercially are dependent upon the continuance of its operation. This must be either by the Stratton Estate, the city or some other responsible agency. As the city has recently acquired the property of the local electric light and power company the chances for interesting an outside organization are slim and the possibilities for future ownership apparently narrow down to a choice between the Stratton Estate and the city.

If the trustees of the estate are to continue to own and operate the property they should be permitted to do so the report states, under conditions that will be fair both to them and to the city. A franchise should be entered into that will permit the railway to earn operating expenses and a reasonable return on the investment. Among other things it is recommended that the franchise provide for an adjustable fare schedule based on the cost of rendering service, and an equitable adjustment of the tax situation. For rate-making purposes a fair value of the property should be determined and agreed upon and a reasonable rate of return fixed. An adjustable fare schedule of this kind is shown in Table IV. This provides an even money schedule with no penny changing or annoying delays by adjusting the intermediate fare rates through ticket sale. The minimum sale unit of 25 cents is within the reach of all regular riders. Transfers will be free.

A barometric fund of $75,000 should be provided to cover the wide seasonal variations in traffic. Whenever the cost of service exceeds the gross revenue by more than $50,000, thereby reducing the $75,000 fund to less than $25,000, the next higher rate provided in the schedule should automatically become effective on the first day of the next calendar month and should continue

TABLE V—ESTIMATED EFFECT OF PROPOSED FARES

Schedule	Annual Revenue Passengers	Total Passenger Revenue	Revenue Per Revenue Passenger (Cents)
A	6,350,000	$317,500	5.00
B	5,640,000	371,575	6.58
C	5,043,000	424,907	8.42
D	4,610,000	449,475	9.75
Present	5,278,850	425,475	8.06

in effect during a period of at least three months. On the other hand if the normal fund be increased by more than $50,000, making it in excess of $125,000, the next lower rate of fare should automatically become effective on the first day of the next month. In no event should the fare be changed more than once in three months and then with not less than five days notice. It is to be understood, however, that there would be nothing to prevent the company from voluntarily lowering the fare at any time should it so desire. Estimates of the number of passengers to be carried and the revenue produced under present and proposed rates are shown in Table V.

Most of the car lines are now routed through the business center of the city from one residential district to another. These lines are fairly well balanced, the investigation showed, and with the exception of minor adjustments in the amount of service required few changes are suggested. The present and proposed routing is shown on accompanying maps.

It is recommended that the use of old heavy cars for passenger service be entirely eliminated. By this means the number of two-man car-hours will be reduced 26,556 per year. The schedule speed should be increased from 9.99 m.p.h. to 11 m.p.h. This, with the excellent track, broad streets, easy grades and few stops per mile, will do much, the report states, to remove the prejudice that street cars are slow. This has been created in the minds of the passengers largely by the fact that stops have been unnecessarily long because many of the operators are slow in opening and closing the doors. After making provision for paying a bonus for one-man operation an annual saving of $29,000 in trainmen's wages should result from the substitution of one-man cars for the present combination service.

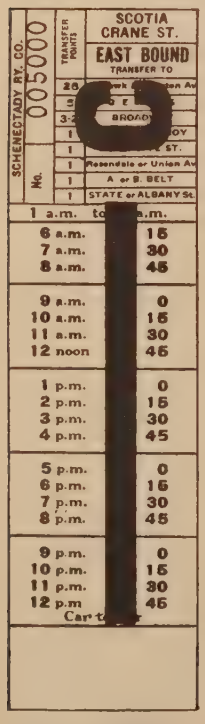
A study of the present power requirements showed that for each heavy car-mile operated approximately 3.78 kw.-hr. were required and for each Birney car-mile 1.51 kw.-hr. Applying these rates of energy consumption to the proposed schedules it is estimated that 2,300,000 kw.-hr. will be required annually. The report states that energy can be purchased from the city at 0.9 cent per kilowatt-hour, including the labor required to maintain the overhead system. Such an arrangement would result in a substantial saving for the railway and at the same time afford the new municipal plant an enlarged output and an improved load factor. It is recommended that power be purchased and the company's power station be held in reserve for emergency use. A total saving of about $31,000 a year is predicted in power cost.

Taxes are levied against the company under thirteen different classifications, the principal ones being the state corporation license, pole and wire tax, state and county tax, street paving and school tax. It is estimated that the total amount of taxes for the year 1924 will be more than $51,000. This is 11.67 per cent of the gross revenue, or higher by 50 per cent than the charges in other comparable cities. It is recommended that street paving assessments be reduced, special license taxes be removed and franchise taxes based on gross income be eliminated.

Various other economies are recommended in the report. It is estimated that under the proposed methods of operation total operating deductions will be $314,525 a year as against $426,386 at present. Applying this figure to the estimated revenue under the four proposed rates of fare it is found that schedule A will result in a deficit of $59,695 and schedule B in a deficit of $5,620.

On the other hand, it has been estimated that schedule C should result in a surplus of $47,712 and schedule D in a surplus of $72,280. Adoption of schedule C, therefore, would make the first mortgage bonds marketable and permit a small interest payment on the capital stock. The report recommends that a new franchise protecting the railway from unwarranted competition and reducing the present heavy tax burdens be granted the company. Adoption of schedule C and the economies recommended in the report would then enable the railway to continue operation on a firm and satisfactory basis.

Red Band on Transfer Indicates Direction



New Directional Tear-Off Transfer Adopted by the Schenectady Railway

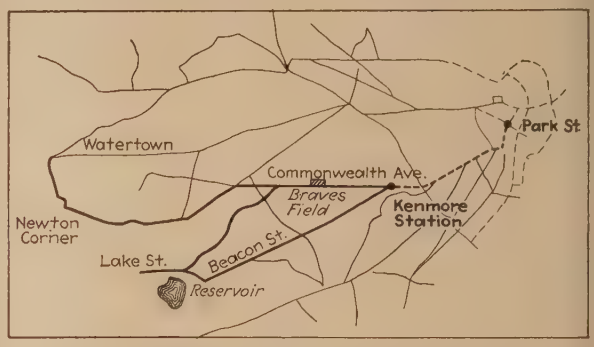
A NEW form of directional tear-off transfer was adopted by the Schenectady Railway on March 1, to supersede the old-fashioned punch transfer formerly used. In many respects the new type is similar to that used by the Bangor Railway & Electric Company, Bangor, Me., and described in the issue of this paper for Sept. 13, 1924, page 392. The transfer holder is also similar. A feature of the new design is a perpendicular red line which appears on all outbound transfers to enable the operator to distinguish at a glance between outbound and inbound transfers.

Each line has a different color transfer. The name of the issuing line is printed in large type at the top and the lines on which it is good are shown on the face. Opposite each line is a number indicating the transfer point, while on the back a corresponding number tells the location of the transfer point.

Instead of printing the ordinary date, one of a series of twenty letters is used for this purpose. This is more flexible and eliminates waste. A somewhat similar arrangement used by the Stone & Webster properties, southeastern district, was described in ELECTRIC RAILWAY JOURNAL for Oct. 4, 1924, page 548.

Stop Elimination Speeds Up Service in Boston

SIGNIFICANT reductions in running time have recently been made by the Boston Elevated Railway on three important lines. The first step in this direction was taken on Dec. 1, 1924, when seventeen stops were eliminated on the Beacon Street line between



Important Reductions in Running Time Have Been Made by the Elimination of Stops on Three Heavy Lines of the Boston Elevated Railway

Kenmore Station and the reservoir. This line operates via the Boylston Street subway from Park Street to Kenmore Station and beyond that point on the surface via Beacon Street to the end of the route. Three-car trains operate on a three-minute headway during the rush. At other times two-car trains or single units are used and the headway is longer.

The old running time from Kenmore Station to the end of the line was fourteen minutes, and it was extremely difficult to keep cars on time. The new spacing of stops averages four to the mile and the running time has been reduced two minutes in each direction, or four minutes a round trip. Moreover, the company has found that it is easier to keep cars on time with the fast schedule than it was with the slower schedule.

Some opposition developed at first to the elimination of certain stops. To satisfy the complaints three were restored, leaving a net gain of fourteen. On April 1 the same plan was adopted for the Lake Street line and the Newton-Brighton-Watertown line. These routes are operated with trailer trains on three-minute and 3½-minute headways in the rush hour. Single cars are operated only for short periods.

Between Watertown and Kenmore Station six minutes are saved on the round trip. Between Lake Street and Kenmore Station the saving per round trip was four minutes. This reduction in running time has so pleased patrons of the railway that requests have been made by the public for the elimination of other stops. The company is planning to accomplish savings on other routes by the adoption of a similar plan.

Three-Car Trains On Beacon St. Near Kenmore Station

Beaver Valley Traction Introduces Sunday Pass

ON EASTER SUNDAY, April 12, the Beaver Valley Traction Company, which has been using a great variety of adult and school weekly passes since Feb. 13, 1922, added a pass good for Sundays only. The price of 25 cents compares with a fare of 5 cents per zone, but as the pass is available for all the trolley zones of the company it is possible to ride the full eleven zones (20 miles) between Leetsdale and College Hill and then take a few more trips on side routes. Examination of the Sunday pass as reproduced shows that it not only suggested excellent uses, but also the back was utilized to push the sale of the weekly pass.

Front and Back of Sunday Pass Introduced by the Beaver Valley Traction Company on Easter

In its more than three years of pass experience, the company has increased weekly pass sales from $513 to approximately $2,100, which represents a maximum sale of nearly 1,700 passes at prices ranging from 50 cents for a school pass to $2 for an all-zone adult pass. Because of his belief and enthusiasm in the pass plan, C. D. Smith, general manager, has found it possible to increase sales by more than 30 per cent over the same months a year earlier. This has been achieved partly by seeing that all the car operators were always kept amply supplied, partly by placing the pass on sale at five different stores and partly through advertising.

When the Sunday pass was introduced, Mr. Smith went still farther in sales effort, for department heads and office employees were also enlisted as salesmen in addition to those selling the weekly passes. The colored janitress with a sale of 25 passes actually did better than all other employees outside the car operators. Two of the latter were tied for first place with a sale of 90 passes each. Prizes of $3, $2 and $1 had been offered as an incentive for the first Sunday.

So far as actual revenue is concerned the idea of putting more life into the Sunday riding proved a success. In addition to the 1,559 weekly passes still good on Easter Sunday, the last day of the pass week, the company sold 1,341 Sunday passes. As only 2,000 passes had been printed, a number of operators found themselves running short before the day was over.

The revenue from the Sunday passes on April 12 was $335; adding this to the cash fares and pro-rated weekly pass receipts of $1,079 gave a total revenue of $1,414, compared with $1,382 on Easter Sunday in 1924. Last year's Easter Sunday, however, included $58 on the Riverview line, which is now operated separately as a part of the Beaver Valley Motor Coach Company. Therefore, the comparative figure for last year is $1,324 and the gain in revenue becomes $90 or nearly 6.8 per cent. Even though Easter of this year was a more pleasant day than Easter of 1924, the management is inclined to the belief that the Sunday pass was the cause for the increased revenue. It has good grounds for this in the fact that the two preceding Sundays, April 5 and March 29, ran $132 and $93 respectively under the two Sundays preceding Easter, 1924.

As was true at Pittsburgh, the Sunday pass proved a particular hit with children. The trainmen also reported an unusually large number of young couples, due, probably, to the combination of Easter finery and Sunday passes.

One incident that showed the immediate ride-creating power of the pass was that a maid who had been engaged by the wife of a company official called in person to state when she would begin her duties. The girl said that she had intended telephoning, but as she had bought a Sunday pass it occurred to her that a personal visit would be more satisfactory.

The Readers' Forum

Fair Attitude Commended

CITY OF DETROIT
Department of Street Railways
May 23, 1925.

To the Editor:

I want to congratulate the JOURNAL upon its fairness and broad-mindedness in printing the editorial of last week which commented upon our third anniversary. I think you have shown that you are one trade paper in a thousand, by your boldness and fairness in making the statement you did. Altogether, I think such an attitude is a mighty healthy one and augurs well for your influence on the entire electric railway industry.

We, here in Detroit, do not believe that municipal ownership and operation is a general panacea to be applied everywhere. On the contrary, we would be absolutely against the idea of this type of ownership and operation in the majority of the cities in the United States. What this operation has demonstrated to the writer is that were the actual professional street railway men of the companies allowed to do the job as good craftsmen would wish to do it, there would be a great deal less ailing in the street railways of the country.

ROSS SCHRAM,
General Manager.

Safety Council Emphasizes Need of Sustained Effort

NATIONAL SAFETY COUNCIL
CHICAGO, June 1, 1925.

To the Editor:

It is a pleasure to read the editorial in your issue of May 23 entitled "Sustained Effort Is Necessary to Achieve Results in Safety Work." The electric railway companies and the community organizations that have accomplished permanent results in the reduction of public accidents know that spasmodic and spectacular campaigns often accomplish more harm than good. We go so far as to recommend that a "Safety Week" or similar campaign should never be undertaken except as the beginning of a permanent, continuous program of public safety education.

S. J. WILLIAMS,
Director Public Safety Division.

Association News & Discussions

Well-Balanced Program at Mid-West Meeting

Use of Buses by Electric Railways, Track Construction and Maintenance Costs, Improvements in Equipment, Safety Work and Bus Regulation Were Among the Subjects Discussed

ONE of the most successful meetings ever held by the Mid-West Electric Railway Association took place at the Baltimore Hotel in Kansas City, Mo., May 25 and 26. Papers on subjects ranging from co-ordination of rail and bus transportation to the maintenance of track were actively discussed by some 150 electric railway men present and furnished the basis for a comparison of experiences and practice.

Under the subject of "Co-ordinated Transportation," F. G. Buffe, general manager for the receivers Kansas City Railways, not only presented an exhaustive discussion of the place of the bus in the modern scheme of transportation but also outlined some of the principal design requirements for present-day city bus operation. This paper is abstracted elsewhere in this issue.

In a paper on "Track Construction and Maintenance Costs" R. H. Findley, superintendent of track and roadway Omaha & Council Bluffs Street Railway, called attention to the importance of unsprung weight on cars as a factor in the life of electric railway track. An abstract of the paper appears elsewhere in this issue.

Ernest Stenger, president and receiver Denver Tramway Company, expressed his gratification at the large attendance and keen interest displayed during the meetings. He pointed out the value of sectional association activity, holding that such meetings supplement the work of the American Association by bringing railway men in a given territory together for better acquaintance and understanding of sectional interests. He laid particular emphasis on the importance and value of frank and informal discussion of common problems.

Other papers on important present-day railway subjects rounded out a well-balanced program and helped to stimulate discussion. Taking up the matter of organized safety work, B. Hilburn, general manager Tulsa Street Railway, Tulsa, Okla., said that accident prevention has a broader significance than the mere saving of injury claims. From the humane standpoint it affords the opportunity for the conservation of life and limb, and in addition to that is of material importance in building good will through the reduction of injury law suits. Another important result obtained from properly organized safety work was held to be the constructive effect of interest aroused in the mind of the operator, upon his general attitude toward his work and toward the public. With this end in view, the safety organization in Tulsa, Mr. Hilburn said, combines the work of accident prevention with what is generally termed welfare work. This activity is handled through a central committee which directs the work of sub-committees and of team captains. These sub-committees include a "safety committee," an "equipment committee" and a "publicity committee."

Constant vigilance is necessary to avoid lagging of interest in this activity, and a safety director is employed to devise new ways of arousing interest and keeping the work active. The personnel of various teams is selected by the elected team captains. Each captain chooses the members of his team in rotation, until all employees are selected. The organization of these teams is broken up frequently so as to prevent discouraging the individuals on a particular team which ends the contest with a low record.

In grading the teams, the nature and consequences of each accident, rather than number of accidents reported, are considered by the central committee. Any negligence of the operator receives careful consideration, with the result that the trainmen members of the central committee receive invaluable first-hand knowledge of the character of negligence which results in accidents. This general plan was started in February, 1923, in Tulsa, and resulted in a reduction of accidents reported in 1923 to 865 as compared with 1,560 in the year 1922. At the same time accident law suits were reduced from eleven, involving $146,000 in claims for 1922, to five involving $71,000 in 1923. In 1922, $9,280 was paid in claims without litigation, while in 1923 this was reduced to $2,831.

Improved Design Reduces Motor Maintenance Cost

Steps which have been taken by manufacturers in the reduction of first cost and maintenance of car equipment were outlined in a paper by J. C. Thirlwall, General Electric Company. He said that weight reduction affords a ready method of reducing first cost and power consumption, but that ultimate saving is dependent on holding down maintenance cost as well. Figures were cited to show that a balance between these various factors had apparently been made on commonly used modern types of equipment, both single and double truck.

Modern types of motor equipment, Mr. Thirlwall held, have effected material reductions in maintenance costs over older and heavier motors. Even when equipped with modern gears, improved bearings and better brushes, lubrication and insulation, the average maintenance cost of many of these older and heavier types of equipment, he said, ranges from $3.50 to $4 per 1,000 motor-miles, while modern and lighter motors are being maintained for from 50 cents to $1 per 1,000 miles. This reduction was attributed to improved design, the use of higher grade materials and better construction in the motors. At the same time it was pointed out that improved maintenance practices and machinery have helped to bring these costs down.

As an illustration of the improved performance of modern motors, records of the Connecticut Company for the years 1922, 1923 and 1924 were quoted. According to these figures, older motors of the GE-67, GE-70, GE-80, GE-87, West.-68, West.-93 and West.-101 types were operated a total of 143,000,000 motor-miles with 1,057 armature rewinds, or an average of 135,000 miles per rewind. During the same period, modern motors of the GE-200, GE-203, GE-258, GE-264, West.-506, West.-508, West.-532 and West.-632 types were operated a total of 144,000,000 motor-miles with only 524 rewinds. Most of these later motors had been in service for periods varying from five to ten years, but showed more than double the mileage per rewind of the older designs. Troubles from field, bearing, brush-holder and commutator lead failures showed still more favorable records for the more modern designs of both manufacturers. The very light, low-wheel, high-speed motors used on light-weight single-truck and double-truck cars were operated 12,400,000 motor-miles during the year 1924 with only seven armature rewinds. The average age of these machines, which included GE-258, GE-264 and West.-508 equipments, was about 4½ years.

Another example of the savings that are made by modern equipment and modern maintenance methods was given. In this case, on a large Eastern property the mechanical department spent an average of $1,420,000 annually on the maintenance of car equipment during the years 1918, 1919 and 1920. After a large part of the rolling stock had been replaced with modern cars, and the inspection and maintenance methods and facilities had been modernized, the average expenditure during the years 1923 and 1924 was reduced to $835,000. Mr. Thirl-

wall testified that the equipment on this particular property was in much better and more reliable condition than when the larger maintenance expenditures were being made.

Better Bus Regulation Needed

Recent transportation legislation in the territory embraced by the Mid-West Association was discussed by O. Q. Claflin, chief attorney Kansas City, Kaw Valley & Western Railway. As important recent legislation of this type had been enacted in the state of Kansas, he explained some of the features of the bus regulatory law recently passed in that state. He said that preliminary work on a measure of this kind had been started two years before, and that during the last session of the Kansas Legislature no less than five different bills were introduced. One of these was finally passed, but Mr. Claflin contended that this was far from a satisfactory measure. He objected particularly to the method provided in the new law for fixing the tax on buses, and maintained that a ton-mile tax is the only proper and fair method of apportioning a fair part of the cost of road maintenance on buses in proportion to their use of the roads.

During the legislative session there was a general sentiment in favor of the passage of some sort of bus regulatory measure. Several different methods of fixing the tax rate were proposed. These included both a vehicle unit rate and a seat capacity basis. Instead of the ton-mile tax, however, a modified unit rate varying from $40 to $230 per bus per annum, depending on capacity, was adopted.

Under the new law, Mr. Claflin explained, the function of the commission will be primarily the issuance of certificates of convenience and necessity. All bus carriers operating at a given time specified in the act will be presumed to be convenient and necessary unless proved to be otherwise by evidence submitted to the commission. In regard to convenience and necessity, Mr. Claflin said, there will probably be some difficulty in determining how inland towns previously without transportation may be served by buses without competing with existing rail lines over certain parts of their routes.

In the preparation of evidence before the commission looking to the elimination of destructive competition, he advocated greater stress on the subject of the character of service now rendered by electric railway lines, and advised against laying so much stress on the damage done to railway receipts by the bus competition. He said that the adequacy of existing service must be established to prevent the issuance of a certificate.

Due to the unfair advantage which is given to buses by allowing them to use the highways at low cost, he said that the Kaw Valley line is considering asking the next Kansas Legislature to pass a law giving the commission the right to maintain the present railway right-of-way, and to allow the company to furnish rail transportation at a rate of 1 cent per mile one way or 1½ cents per mile for the round trip.

All of the papers presented during the meeting were discussed from many angles, and the subject of legislation received particular attention. R. B. Campbell, general manager Arkansas Valley Interurban Railway, agreed with Mr. Claflin that the ton-mile tax basis is more scientific than a flat vehicle rate, but called attention to the fact that even this method of apportioning road maintenance cost eliminates the factor of speed. He said that at a conference of electric railway operators, held to consider the legislative program, some had advocated a gross receipts tax in preference to other methods. In Kansas, the ton-mile tax was considered to be more complicated than a flat rate, and consequently more expensive of collection.

Mr. Campbell maintained that the regulatory features of the bus law are of more importance than the matter of taxes. He held that inclusion of the requirement for establishing both convenience and necessity is an important provision in the new measure from the standpoint of protecting existing rail facilities.

Mr. Campbell explained the action which is being taken by the rail and bus companies with which he is connected for testing the new law and establishing a precedent under its provisions. As president of the Arkansas Valley Transportation Company, a bus operating organization which is competing with the existing rail line of which he is general manager, an application has been filed for a certificate of convenience and necessity. As an official of the Arkansas Valley Interurban Railway he is opposing the granting of this certificate on the grounds that the service now rendered by the rail line answers all the reasonable requirements for public transportation in the territory served. Mr. Campbell explained that this proceeding is being instituted frankly before the commission with the expectation that the request for a certificate to compete with the rail line will be denied, thus establishing a precedent for the administration of the new act where proper service is now being rendered by rail lines in the state. Commenting further on Mr. Claflin's views, he maintained that it is important for evidence before the commission to show financial injury caused by bus competition, since such financial injury directly affects the ability of the existing road to render proper service in its territory. Mr. Campbell also said that it is difficult accurately to define common carriers under the terms of the new law, and that the possibility for many technical variations in this definition will require close study on the part of those interested in the enforcement of the measure. Mr. Claflin held, however, that the requirement for issuance of a certificate of convenience and necessity is not a cure for unfair competition between buses and rail lines. He maintained that the bus must be taxed an amount which will put it on a comparable economic basis with rail lines which maintain their rights-of-way, pointing out that only under these conditions will a true comparison of both the relative cost and convenience of the bus and the railway be possible and fair.

Mr. Buffe pointed out that one of the serious problems in obtaining constructive legislation is that of getting all railway interests to agree on a general program. He insisted that electric railway men should be the last to advocate restrictive taxes of any kind—on buses or anything else. Instead, he maintained that they should be united in advocating reduced taxes on existing transportation agencies and relief from such forms of indirect taxes as paving costs.

The status of bus regulation in Colorado was explained by Mr. Stenger. He said that under the Colorado law a certificate of convenience and necessity must be obtained by a bus line only if the proposed service is competitive to an existing rail line. In view of the constantly changing conditions and rapid development taking place in the use of the bus as a common carrier he felt that it is very difficult to foresee a proper bus legislative program, but expressed the conviction that, under any circumstances, the bus must pay its own way for the maintenance of the highways. Otherwise, he pointed out, we will be living on the cream of highway transportation facilities today and leaving only the skimmed milk—in the form of badly depreciated roads—for the next generations. He said that if the intercity bus can furnish a better service more economically than the interurban, it must inevitably displace the rail carrier. However, to avoid serious economic waste, the bus must assume its proper burden of road maintenance cost, and this must be done before the interurbans are badly crippled by economic favoritism to the bus. He advocated the principle of making the user pay for the maintenance and upkeep of the roads, as a sound, economic policy. As an illustration of the importance of the subject he said that one road in New York had been rebuilt four times while the bonds issued for the original construction were still unpaid. In England, he added, where some of the roads are much older than in this country, and where more experience has been obtained in the cost of their upkeep, the cost of road maintenance assessed against a Ford car is about $140 per year.

Similar frank discussion took place of all of the other papers that had been presented. At the annual banquet, held on Monday night, Judge Charles H. Mayer, general counsel St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., made a plea for co-operation among railway men in the attack on their many problems, and pointed out that such co-operation would inevitably develop a leader with the vision and courage to carry the transportation banner to economic victory.

The following officers and directors were elected for the ensuing year: President, R. B. Campbell; secretary, treasurer and general manager Arkansas Valley Interurban Railway; vice-president, A. E. Reynolds, vice-president and general manager Springfield Traction Company, Springfield, Mo.; secretary-treasurer, J. A. Weimer; executive committee, H. B. Cobban, F. G. Buffe, R. J. Lockwood, E. Stenger.

Future of the Bus and the Electric Railway*

Present Indications Are that the Public Will Demand Bus Transportation in Every City of Considerable Size—For Best Results Such Service Should Be Operated by the Electric Railways and Co-ordinated with Their Service—Requirements in Bus Design Outlined

By F. G. Buffe

General Manager for the Receivers Kansas City Railways

YOU gentlemen are no longer in the street railway or the interurban business. You are transportation men engaged in moving passengers and freight. Instead of a one-price, one-item store we are entering the transportation department store business, where we won't have to turn away customers because our line is limited. From now on we are really going to merchandise tranportation.

The street railway industry has made a long and heartfelt study of the bus situation, although in some instances the study has been too long and procrastination has proved expensive.

There was a tendency a few years ago to take the position that the bus had no fixed place in urban transportation and a disposition to sidetrack bus propaganda. But the idea spread and as more installations were made, the fact was soon recognized that the bus was inevitable. There was some talk of feeder lines and auxiliary service, but the last twelve months have brought a revolutionary change in thought and practice. In a very short time there will be no city of importance that does not have bus transportation.

At the meeting of the executive committee of the American Electric Railway Association in Washington on Feb. 16 a broad policy regarding the motor bus was unanimously adopted. It accepts the bus from headlight to taillight and states the only proper attitude towards competition. It assures the public that the members of the association realize their duty to furnish good public service, and that whatever is essential to such service will be furnished by these recognized and regulated transportation agencies. It calls for uniform regulation, the lack of which today is one of the weak spots in the entire bus situation. It recognizes a liability for reasonable proportionate taxes and other public obligations.

From a strictly street railway viewpoint it is comforting of course to agree with the first statement of these principles, "that no medium has yet been developed which alone can take the place of the electric railway in moving large numbers of persons in the rush hours in cities," but times and methods change rapidly and the bus is developing so fast that in a short time this statement may need modification. Undoubtedly there is nothing yet that can practically or economically replace street cars for mass transportation, or that can supply a similar service at as low a rate of fare, or that can give the same universal transfer system.

It is not likely, in the very nature of things and as our modern cities are now constituted, that the bus will ever be permitted to assume such a task, but this does not detract from the fact that motor buses in London are moving more people than are surface lines, nor does it weaken the statement that motor buses are now being built which can consistently handle rush-hour business with a comparatively slight increase in the number of units, and with a very small percentage of the total capacity as a standing load permitted. However, for all general purposes there is no danger of anything supplanting the present system, and it just as well that we nail our flag to the mast and stand by the ship. The outstanding point is that street railway men have quit thinking in terms of street cars and have broadened their vision and their jobs so that they have become transportation organizations, ready and willing to furnish motor bus transportation in co-ordination with street railway service wherever there is a field or a reasonable demand for such facilities.

You can't put the bus in a side street in a neglected suburb and satisfy the public demand. The average citizen wants to see and use buses on downtown routes and on the principal streets of his town. He is demanding real bus transportation. He wants a bus when he wants it, and present indications are that he wants it in every city in this country, and unless the present transportation organizations give it to him he is going to find some one who will.

For one man who is really concerned with the economics of the transportation situation, there are thousands who think about it not at all and care less, as long as they have what they consider is the proper transportation service. Whether Dick Smith or Tom Jones or the railway company operates the bus lines is with them a matter of little concern.

The motor bus is no longer a theory, no longer a threat, no longer the dream of visionaries, no longer an instrument for adventurous souls with lots of nerve and little credit—it is here now, today, as a recognized, popularly acclaimed unit in the transportation scheme. As Boss Tweed once said, "If you can't lick 'em, join 'em," and the mourners' bench is crowded with hard boiled street railway men who are busy joining. I know, because I am one of the joiners. Any transition period is troublesome, vexatious, full of mistakes, and often economically wrong, but these things don't stop transition, which is another way of spelling progress.

Revolutionary methods are expensive but they can't be stopped. As street railway men we have felt sure that mass transportation from the standpoint of economy, from that of congestion, could best be handled by large, electrically propelled units on steel rails. That position has seemed sound. It doubtless is, but changes are rapid. It was only a few years ago that many were of the opinion that buses were expensive and unprofitable. Then they were rather drudgingly accepted as possibilities for feeders or limited auxiliary service. There was a brief period of experiment with the trackless trolley, and now in almost every city street railway men are talking buses, planning buses and buying buses.

It will perhaps be an interesting fact to many, as it was to me, that in London there are more motor buses in regular operation than there are surface or subway cars. London has a total of 4,800 motor buses as against 2,585 surface or underground cars. There are in addition a number of suburban tram systems and much suburban steam road traffic. Of the 2,691,000,000 passengers handled by buses, tramways and undergrounds, the buses carried 1,214,000,000, or more than 45 per cent of the total.†

While London does not have the private automobile congestion of our larger American cities, it would seen that the tremendous number of these vehicles and the large percentage of passengers handled by them would to some extent weaken the argument that mass transportation cannot be handled by any other vehicle than a street car. This percentage becomes larger when we compare the number of passengers transported by London buses as against the number carried by surface tramways. Last year the tramway systems in London transported 909,000,000 people against 1,214,000,000 for the buses.

There have been many verbal bricks thrown at bus manufacturers, some of them justified and some of them on general principles. Without doubt individuals selling buses have been guilty of muddying the waters. Some have financed competition; some have invaded fields in which they had no business. But my observation is that most of them want to be good and are anxious and willing to join forces with the electric transportation companies. There are always two sides to a story, and before we condemn we should get the facts. I have personally investigated several of these tales that float around and found that my impressions were wrong, my information faulty and my conclusions at times at variance with the facts.

Several years ago the bus manufac-

*Abstract of paper presented at the annual meeting of the Mid-West Electric Railway Association, Kansas City, Mo., May 25-26.

†See ELECTRIC RAILWAY JOURNAL, Sept. 20, 1924, page 425.

turer was in an uncomfortable position, and like Hamlet didn't know whether to suffer the slings of fortune or do something to end them. He had a plant, an organization and a good, marketable product. On every hand truck factories, fire engine factories, wagon factories, automobile factories, were going into the bus field. He was besieged by Tom, Dick and Harry for surveys, prices and help in establishing bus lines. Street railway men were hostile and were moving heaven and earth to stop the spread of the bus idea. The manufacturer who desired to co-operate and to work out transportation problems with the street railway companies saw competitors step in and take the business. He was between the devil and the deep sea. In one city he was in bed with the street railways and in another he couldn't eat in the same restaurant. So perhaps we shouldn't be too critical of the past two or three hectic years.

The wide-awake legitimate manufacturer realizes that electric transportation companies are his best customers. Their credit is good; the transportation problem of the cities is in their hands; and in the very nature of things competition is an impossibility in a business that is a natural monoply.

My personal opinion is that the slate should be wiped clean and that we should accept the broadminded, progressive bus manufacturer for what he earnestly desires to be, a friend. The scalawags and trimmers can soon be discovered and read out of the congregation. The company which encourages competition; which stirs up trouble; which finances dummies; which gives commissions and bonuses to politicians or others; which misrepresents facts; will be found out and will be a maverick without friends either in the street railway or the bus field.

Transportation, especially urban transportation, is a natural monoply except in the extremely large centers of population, and even in those it would be better if all transportation facilities were under one direction. From the very nature of the business competition in mass transportation facilities cannot continue. Due to rush-hour conditions, the single fare system, extensions of city areas and the consequent demand for service, the necessity of supporting non-paying lines in the development stage, all possible revenue is required to support the facilities necessary for a complete, city-wide transportation system.

The introduction of the motor bus has often resulted in competition, and unfortunately, the bus has been allowed to compete unfairly in being given the advantages of short hauls, heavy traffic density and escape from paving and tax burdens. Where such a condition continues the street railway will eventually be so crippled that it can no longer provide a uniform service at its present fare.

In the end the public pays the price of such costly experiments. There are numerous examples where heavy bonus prices have been paid by street companies in order to stop disastrous competition, and the interest charges on such investments must in the end be passed on to the public or lost by the investor.

Just what do we mean when we say co-ordinated transportation? Webster says co-ordinate means "Equal in or of the same rank, order or importance, not subordinate." Also, "To adjust; harmonize." So co-ordinated transportation would imply an adjustment of transportation facilities. It implies furnishing the service the public desires, not making one method subordinate to the other but fitting each type to its proper field so as to avoid duplication, and at the same time render a more efficient and a more desirable public service.

Before the advent of the automobile our cities developed along transportation arteries. But with the almost universal ownership of private transportation there has been a decided change in the method of growth. Wide areas have been developed away from car lines. New sections have been opened and in every city extensive boulevard systems afford transportation paths for thousands who drive their own cars.

It is this new field we must tap if we can. In planning our co-ordinated system we should utilize the boulevards and compete with our own car lines as little as possible. We should try not only to serve such unserved territory but to sell our wares to new customers and bring back our old ones.

There are, of course, dangers to be avoided, pitfalls that lie in wait, and attention should be called to them and our energies directed to avoiding them. Taxation, excessive extensions, universal transfers, low fares, car line competition, adverse legislation, must all be watched.

There is already a tendency on the part of public officials to burden this infant transportation with taxes, and unless stopped its extension and success will invite new attacks; city gasoline tax, state gasoline tax, street and highway taxes, war tax, city, county and state personal and property taxes, present an imposing and dangerous array. Reasonable taxation is right and proper, and bus transportation should shoulder its proper share of the public burden, but this is no excuse for the imposition of unreasonable taxation. It is unjust to base a tax upon the pavement wear of a 15,000-lb. double-deck bus running on 6-in. pneumatic tires, when 35,000-lb. sand trucks on solid tires are using the same pavements without tax.

Unwise extension of bus service is another peril that is all the more dangerous because it can be so readily sugar-coated. A new bus line requires nothing but the buses and a schedule. There will be pressure of a serious nature to open new territories, to run buses on car line streets, and unless restricted an otherwise profitable bus system can be throttled by such parasite lines.

The universal transfer and the low fare present another difficult problem. There can be no good reason for either in a co-ordinated system except in the case of feeder or crosstown service. The bus is not the successor to the street car nor should a ride be sold at the same fare. The street cars furnish the low-fare, rush-hour, universal transfer service. The bus is a different vehicle offering a different service and the price should be in accordance. Even where transfers are given for feeder service the differential should be maintained.

Car line competition must be watched. Bus lines should be laid out so as to draw from car lines as little as possible and to reach and attract a new class of patronage. The rush hour belongs to the cars. There should be no large investment in rush-hour buses in a co-ordinated system. But schedules should furnish a good all-day service that will attract the shopper and without endeavoring to handle the peak-load crowd that would necessitate a large investment in short-hour buses.

To my mind, a seat for every passenger at a commensurate rate of fare is the greatest bus appeal. I do not think the private automobile has taken our business so much because of noise and the other so-called drawbacks of street cars as on account of the rush-hour crowds and the standees. People do not like to be crowded or stepped on or over. No man likes to get a seat only to give it up to a woman, no matter how gallant he may be.

There is every reason to forecast that bus transportation is just in its infancy, and even the most optimistic will be surprised by the development of the next five years. Outside of replacements in congested centers and on heavy lines, it is highly probable that very little new track will be laid, and bus service once instituted will gradually take the place of many sections now served by street cars. The cost of a mile of paved double track is in excess of $100,000, enough to buy ten to twelve buses, which would give a six-minute headway on a 5-mile route. A street railway system has only about 20 per cent of its total investment in rolling stock, whereas a bus system has more than 90. Kansas City has approximately $40,000,000 invested in street railway facilities, and has 747 passenger cars, or an investment of more than $53,000 per car. Twelve hundred double-deck buses would provide a seat for every passenger that these 747 street cars carry seated and

COMING MEETINGS
OF
Electric Railway and Allied Associations

June 10-12—Canadian Electric Railway Association, Montreal, Quebec.

June 16-19—Society of Automotive Engineers, White Sulphur Springs, West Virginia.

June 22-26—American Institute of Electrical Engineers, Saratoga Springs, N. Y.

June 26-27—New York Electric Railway Association, Hotel Champlain, Bluff Point, N. Y.

July 22-25—Pacific Claim Agents' Association, Hotel Biltmore, Los Angeles, Cal.

Oct. 5-9—American Electric Railway Association, annual convention and exhibits, Young's Million Dollar Pier, Atlantic City, N. J.

standing, and the total investment would not be to exceed $15,000,000 in buses, shops and garages. To earn 7 per cent on the street car investment requires $3,700 a year per car, where an earning of $920 per bus per year will pay 7 per cent on the bus investment.

From the standpoint of the passenger a bus should be pleasing in appearance; provide a comfortable ride and be as safe as it is possible to make it. We are making a plea for more business and more riders, and are hopeful that the institution of bus service will attract riders from those now using their own private transportation. There is a psychological appeal through appearance and such details as seating, lighting, heating. The highest possible speed consistent with safe operation is not only necessary from the passenger viewpoint but also essential in the reduction of operating cost. The use of air is desirable in braking heavy units not only as a matter of safety, but in the relief to the operator from the fatigue incident to manually operated brakes. Air also permits interlocking safety features and air-operated doors, which not only make operation safer but increase speed and accelerate passenger movements. A low center of gravity and a correspondingly low step are important, as an insurance against the danger of turning over and for the comfort of passengers. A low center of gravity gives a feeling of stability, and low step heights are a large factor in preventing boarding or alighting accidents. Every attention should be paid to the passenger's comfort, which is influenced by the character of seats, the width of the aisles, the lights, ease of entrance and exit, floor and step heights, absence of body noise and vibration, ease of acceleration and retardation, etc.

From the operating standpoint economy is just as important as the public appeal. The margin between expense and income is small, and any tendency to increase operating cost would soon wipe out profits. A sturdy, dependable type of chassis is necessary; one that will require a minimum of repairs and maintenance expense. All parts should be accessible and so far as possible units should be interchangeable. The engine should be built for the service; should be designed for ease in taking down and should have a high torque and comparatively low speeds. It should be powerful enough for the service required.

There is no economy in a cheaply constructed, light bus that in a year or so will be requiring constant attention and high maintenance. A bus should be built for from 250,000 to 300,000 miles. In the life of such a bus the gasoline used will be more than the original cost of the bus, as will maintenance.

Speed is a large factor in economical operation, and due to frequent stops the maintenance of high scheduled speed in city transportation is extremely difficult.

The average bus makes from six to ten stops per mile and it is manifest, therefore, that the less time consumed in loading and unloading the greater the speed that can be maintained. Every facility should be provided to secure a rapid interchange of passengers. With comparatively narrow aisle and entrance, an air-operated exit door should be installed which will permit passengers to unload at the rear as others board the bus in front.

Double-deck buses should be designed for one-man, two-man operation, which can be secured through the use of air-operated doors and interlocking safety devices.

There is much to be said in favor of a steel body as against the wood construction now generally being used. Experience in street car building and operation has proved the advisability of steel. Such bodies are more substantial and are less noisy than wood. Their life is longer, and undoubtedly maintenance costs will be less. From the safety standpoint there cannot be any comparison.

The gas-electric drive has recently attracted much attention and several large installations are now being made. The electrical equipment consists of a generator directly connected to the motor, which supplies current to operate two electric motors directly connected by gears and pinions to the rear axle. This equipment can be installed on practically any type of chassis and many advantages are claimed for it. It is quieter, has a more simple control and provides a faster and smoother acceleration. The driver is relieved of the heavy labor of gear shifting, and there is no vibration or transmission noises. Less maintenance and greater fuel economy are claimed as a result of more uniform engine speed. Absence of skidding is also emphasized. The arguments against it are that it adds approximately 2,000 lb. to the weight and $1,800 to the cost of the bus.

There is now sufficient operating data to show that the bus is a very economically operated unit, averaging less than the cost of operating street cars. Single-deck operation, depending upon wages paid and the type of equipment, runs from 18 to 25 cents per mile. Double-deck buses can be operated with one man for from 25 to 28 cents per mile and with two men from 30 to 35 cents. These costs include all depreciation charges, overhead and insurance, and are conservative.

There are other favorable arguments for the bus in city operation, such as flexibility, curb loading, and unloading, and the ability to avoid traffic jams and blockades.

There is a large field for express bus service in our cities at a price of 25 cents or more, somewhere between the cost of an ordinary bus ride and a taxicab. There are many people who now drive their own automobiles who are willing to pay for comfort and speed, and such non-stop express service undoubtedly deserves serious consideration. This is a new and as yet practically untried field, but large cities with their widespread residence sections invite some better and faster transportation than the stop-to-stop service, and at the same time less expensive than the private car or the taxicab. Our job is to furnish transportation at a fair profit and meet the public demand and need, whatever it may be.

Factors in Track Construction and Maintenance Costs*

By R. H. FINDLEY
Superintendent Track and Roadway
Omaha & Council Bluffs Street Railway, Omaha, Neb.

RIGID economy in the cost of operation of electric railroads has been so essential the last few years that many electric roads have taken advantage of the developments in construction methods and equipment made necessary by the increased cost of labor. Mechanical devices of all sorts, some almost human in their action, are now used in attempting to reduce cost of construction. Mechanical excavators, cranes, automatic buckets for handling bulky materials, pneumatic tools of all descriptions, dump cars, etc., are all in common use on the larger properties where the volume of work necessary makes their operation profitable.

These devices have effected large savings in cost of construction, in place of the old method of using large forces of laborers at prevailing rates of pay. Most other construction work in our cities has undergone a similar revolution. In this industrial age, an excavating machine rooting up pavement, etc., on a city street does the work of fifteen or twenty men. Likewise a truck will do the work of four teams and drivers. Concrete mixers of latest type are operated by five or six men with truck delivery of dry aggregates instead of 22 to 25 men as was formerly the custom. Pneumatic concrete breakers permit two men to do the work of six or eight in a day. Two men with unloading cranes will do the work of ten or twelve hand shovelers, and so on down the line. Considering the fact that some construction work is still of such a nature that a machine cannot be used to replace labor, it is probably true as a general average of all construction activities that the same volume of work is now done with from 35 per cent to 50 per cent fewer workmen than were used ten years ago.

The present laws restricting immigration are responsible in a great measure for this situation in the construction field. The falling off in immigration due to these limitations is about 1,000,000 per year, based on the pre-war rate of influx. This number of people distributed uniformly over the country would mean about 2,000 more immigrants per year into Omaha, or 3,500 more to Kansas City. It has been absolutely necessary, since the war, to overcome this labor deficiency. The only way to accomplish any great volume of work has been to use machinery

*Abstract of paper presented at the annual meeting Mid-West Electric Railway Association, Kansas City, Mo., May 25-26, 1925.

as far as possible. In order to realize such economies the cost of equipment has created a high construction plant expense, due to interest, depreciation and repairs, which has considerably cut down the net apparent labor saved. Because of this plant expense, many of the devices now used would not be economical if common labor were as plentiful, cheap and efficient as in pre-war times.

Selection of one or more of the very numerous types of track construction used today throughout the country, should be fundamentally based on the idea of reducing the track costs per passenger carried. Much can be said for each of the various types of construction, varying from the most rigid steel tie monolithic track to the very plainest types. Each has its advantages and disadvantages.

The widespread tendency toward the operation of lighter street cars should result in a material reduction in maintenance and depreciation of our track. Further application of alloy steels and other high-grade materials in car construction should bring still further weight reductions. However, a great reduction in the unsprung weight on present and future cars would be a boon to us maintenance of way men. The rigid rolling load over the rails is what causes us so much grief on both plain track and special trackwork construction.

In Omaha a little less than one-half of our present motor and truck weights is unsprung load. This, in our 900 type cars, is equivalent to a rigid load of 5,600 lb. per truck, or 11,200 lb. per car. In other words, about 27 per cent of the total dead weight of our older types of electric cars for city service is unsprung weight. In some of our two-motor equipment, this percentage is reduced to about 19 per cent. The ideal condition for a rolling load, in order to have the least destructive effect on the support, whether track or pavement, is to have it entirely supported by either springs or rubber. On the other hand the most destructive and damaging rolling loads, and the most noisy, are those which are carried on the rail with no spring support.

Much of the noise from rolling load operation is created from impact, or lack of flexibility. In order to reduce noise, and realize the most life from our track and special work, we should operate the lightest, the most flexible and resiliently supported cars possible. This would also add to the life of the car itself, particularly to the lighter bodies. We should get every pound of weight possible on good shock-absorbing springs.

You can rest a 2,000-lb. pile-driver hammer carefully on a concrete slab with no ill effect. However, if you pick the hammer up several inches and drop it on the concrete slab a number of times, you will break the slab. Pick it up likewise and drop it the same number of times on a properly designed spring bed above the concrete, and the effect of your blow is dissipated in the springs and not in the rigid concrete slab. The resulting effect on the slab of concrete will be only a small fraction of that produced by the rigid hammer blow. Rolling loads are an everyday application of such effects, which apply equally to the life of track or to paved roads. Surely great improvements can be made in equipment design which will eventually have the effect of greatly prolonging the life of the track, to say nothing of the other advantages to be obtained.

It is probably true that over 95 per cent of the wear and tear on track and special work is due to dead load weights only. Certainly and without question, great savings in maintenance of way can be made by reducing the work the track and special work must perform, by reducing these dead loads.

Such improvement in equipment would greatly prolong the service life of track, and consequently, permanent materials, so far as practicable, should be incorporated in the construction in order to resist depreciation through decay, etc. An extremely important element to be considered from this standpoint is the track tie. Long-lived tie support is the real objective in modern main line track design, whether paved or open construction. This may be obtained in several ways. Thirteen years ago our company used a batch of creosoted red oak ties in open track—treated with 2½ gal. of oil to the tie, of a commercial grade of creosoted oil perhaps 20 per cent raw tar adulteration. These ties are all in the track and will easily last twenty years. You can cut your average tie costs 30 per cent per year, through the use of a properly treated tie. This conclusion is gathered from our experience, and is based on an open track life of ten years for white oak, and includes 6 per cent compound interest on first cost in each case, over the periods of life.

The use of treated ties in paved track, particularly in a plain ballasted type, is also good insurance against what I have called depreciation through decay. Our oldest track of plain ballasted construction where treated ties were used is now twelve years old and in excellent shape. The ties, including the sapwood, are in almost perfect condition, as we have discovered from service pipe excavations, and from some joint repair work. This section furnishes from one to two-minute service during rush hours, cars weighing about 20 tons. Rail renewal will be easily accomplished on this section later on, through the use of tie plates and screw spikes.

Our experience has seemed to indicate that successful plain ballasted track construction in paved streets should include the use of well treated ties to insure against sapwood decay. Even though the heart wood of your tie remains sound, a spongy condition of the track will result if your sapwood deteriorates. In many paved streets where good sub-drainage exists, and where the soil is considered good for bearing, expensive ballast should not be necessary, providing there is a good tie under the track. There will be sufficient bearing support, particularly if lighter weight equipment is operated. Machine tamping has given us an improved method of compacting the materials under the tie. With a good concrete paving base, a successful track will result—even with just a thin blanket of surfacing material under the ties. The permanency of the tie is the basic foundation factor in track construction.

Reduction in track and roadway costs to the car rider should be further made by obtaining relief from paving costs. Many arguments pro and con have been made on the subject. We have found throughout the business district of our city that almost all the vehicular traffic is required to pass over the portion of the street paving paid for by our car riders. By actual traffic counts we found that practically every vehicle necessarily must drive on the tracks due to the parking system in vogue, as a result of which about 27 per cent of the street space is used for parking automobiles, while the street cars occupy only about 1½ per cent during the rush hours. It is manifestly unfair to the car rider to require him to pay interest on the investment in this pavement and also to provide a replacement fund to perpetuate it. Cheap transportation is so vital to the interests of any city, that this unfair burden should be removed from the car riders, as it certainly does not belong there today.

Many suggestions have been made as to plans for obtaining such relief. The main argument against assessing the track paving direct to the property owners is that in many cases, streets were paved wider, by reason of the fact that the railway was located therein. Again it is said that costs per square yard are slightly greater by reason of the fact that the lines exist in the street, and that our cars damage the pavement, etc.

On almost all types of city track construction, the railway must concrete its track to hold it in place—pending the arrival of the street paving contractor. This concrete is usually part of the paving support, and must be paved by the railway company when the track is built. In monolithic steel tie track, the concrete is both paving base and track support. The practicable way, no matter how the funds are raised, or where they come from, would be for the city engineering department to allow the same amount per square yard to the railway, for paving its space, as it allows the contractor for paving the sides of the street per square yard. Of course the construction of the railway paving, like the balance of the street, would be under strict supervision of the city engineers. The railway could in such cases pave with any good adaptable type of paving to be approved by the city engineer, in connection with the trackwork, as the railway might desire to use concrete, brick block, or granite, if there were asphalt paving proposed on the street. By this system the car rider would be required to pay the fixed charges on the difference in cost of the two paving types.

The trend of track costs has been downward since 1920, and I believe the downward trend in unit costs will continue gradually. Since the peak of 1920 we have realized an average yearly decline in unit track costs of about 3 per cent per year, although most of this decline took place in two years. Further alterations in types of construction should net additional savings in

our investment costs. We should be extremely cautious, under present day conditions, in our expenditures on track, and feel our way carefully. The development of the private conveyance, and need for retrenchment outlines to us a different problem, and it may be that certain of our installations, such as outlying tracks in sparsely settled locations, may be abandoned. We cannot spend the money, at present costs, to rebuild and pave tracks over which very infrequent car service is being operated.

New Englanders Discuss Car Painting and A.E.R.A. Co-operative Committee Work

CAR PAINTING practice and a discussion of co-operative committee work in the American Electric Railway Association featured the New England Street Railway Club's May meeting, which was held on the afternoon and evening of the 28th at the Copley Plaza Hotel, Boston, Mass. Striking gains in shop efficiency were set forth during the afternoon session in a paper on "Modernizing Car Painting Practice," by H. T. Hurlock, engineer of equipment Eastern Massachusetts Street Railway, Boston. This paper will be published in an early issue of the ELECTRIC RAILWAY JOURNAL. Mr. Hurlock pointed out that by improved methods the number of revenue cars painted annually on his system has been increased from 34 per cent of the total cars operated in 1920 to 82 per cent in 1925, and that the man-hours required for painting a 40-ft. double-truck car have been cut from 340 in 1920 with hand labor to 90.9 in 1925 with spray and hand labor. An extended economic study of the subject formed an important part of this paper.

H. G. Noble, superintendent Everett shops, Boston Elevated Railway, read a paper on "Car Painting." This was followed by one on "Car Cleaning" by O. B. Johnson, inspector of car cleaning for the same company, which is abstracted elsewhere in this issue. Mr. Noble's paper will appear in a later issue.

In the discussion of the papers J. B. Crawford, Concord, N. H., stated that the Concord Electric Railway is changing the color of its cars from olive green to the orange used by the Boston Elevated and that two coats of body color and one coat of enamel are being applied. G. E. Pellissier, Holyoke Street Railway, emphasized the psychological impression that well-painted cars make upon the public from the standpoint of stimulating patronage and of accident reduction. In Holyoke a so-called "Non-Olio" liquid wax preparation purchased in California is used successfully to prevent dust and dirt sticking to the paint. No water is required, and the preparation has a preservative effect on the paint.

H. H. Hanson, manager Middlesex & Boston Street Railway, Newtonville, Mass., said that his company adheres mainly to the brush method of applying paint. It has lately been experimenting with lacquer, but finds that the time required to put on paint by the manufacturers' method and the loss of material incurred cost as much as the brush method. The company has used two colors on cars for the past five years, yellow enamel and bright red. This has given much satisfaction from the standpoint of visibility and selection of cars for territorial patronage, the difference in colors being most helpful to the traveling public. Both colors contribute to accident prevention.

W. C. Bolt, superintendent rolling stock and shops, Eastern Massachusetts Street Railway, briefly discussed open-air storage of cars in reply to an inquiry of G. C. Hecker of the American Electric Railway Association as to the advisability of such storage from the viewpoint of paint preservation. Mr. Bolt said that where a car is operated sixteen to eighteen hours a day it is of relatively small importance whether storage under cover is provided for the remaining hours. The cost of repainting is now comparatively small, and should be balanced in a practical case against the total cost of maintaining storage facilities, in order to decide upon the best policy. Frank A. Barbey, Boston, pointed out that the steam roads have gone through the problem of open-air versus covered storage and that little or no difference in cost has been discovered in favor of providing coverage.

H. E. Potter, Union Street Railway, New Bedford, Mass., said that on their road every car is cleaned nightly, car sweepers covering eight cars per night each. Every month a thorough cleaning is done. Rattan seats are effectively cleaned by a mixture composed of 2 gal. water, 4 oz. lye and 1 pint chloride of lime applied with an old water brush. After the seats are scrubbed and rinsed with water they are dried by turning on the electric heaters. The polish is brought back by the use of Old English wax and the luster is regained by rubbing with a woolen cloth. When interurban special cars are rented the seats are covered with canvas, which adds to their appearance, and the laundering cost is less than $1 per car.

Co-operative Committee Work Outlined

With the exception of an address upon "Business at Bat" by the Rev. Henry H. Crane, Malden, Mass., the evening session was devoted to talks upon the work of the co-operative committee on progress of the A.E.R.A. C. G. Hecker, New York, described this development and pointed out that 55 men constitute the national committee membership on management and co-operation and, with Mr. Wilde, spoke briefly of the general plan of intensive visits to operating properties to secure information on modern practice that will be incorporated in a handbook. All committees are asked to find out the extent to which properties visited are making use of association facilities as well as to discover good practices worthy of being passed on to the industry. Mr. Hecker closed with an account of the Grand Rapids car selection problem, referred in many details to the local public for help in determination from the angle of riding convenience.

F. B. Walker, chief engineer maintenance of way Eastern Massachusetts Street Railway, Boston, summarized the plans of the committee, and A. L. Hodges, Brooklyn City Railway, recounted various progressive practices of that company as a sample of the class of material the committees will seek in their field work.

Safety Practices in Brooklyn*

BY A. L. HODGES
Assistant Secretary Brooklyn City Railroad

WE BELIEVE the work conducted by our Employees' Safety Bureau in Brooklyn is of interest. This work is under the direction of a supervisor of safety and an assistant who meet regularly with 30 safety committees at the various shops and depots. Their activity has resulted in an increase of 67 per cent in the number of shops with 100 per cent safety records in the course of six months.

A butterfly type seat is used in the vestibules and across center exit doorways of the new type cars. When not in use the seat is folded like a book and dropped into a pocket. This design was brought about by requests from passengers to do away with the old-style seat which is hooked up or latched when not in use. Trainmen do not always get the legs under them properly, causing them to give way with passengers' weight.

The 335 new cars are designed so that all wiring is carried through the pier posts and behind the advertising card space by the use of special pressed-steel conduits and conduit fittings. The moldings and panels are made in sections so as to be removed easily.

This arrangement simplifies the wiring arrangement and makes for greater accessibility in repair work. It also eliminates the chances for short circuits due to water, etc., when such wiring is carried under the car floor.

These 335 cars are equipped also with a detachable or "demountable" vestible. These vestibles have double hood plate construction, the lower or sub hood plate extends from the vestible corner post to vestible corner post and is securely bolted to upper or main hood plate.

The vestible corner posts are in two pieces securely bolted. The forward part of each corner post and the two center vestible posts are tenoned into the sub hood plate and the rear parts of the corner posts into the main hood plate. Pocket castings are bolted to the crown piece into which the bottoms of the vestibule posts are fitted. All bolts are made readily accessible with the removal of a minimum amount of inside finish. These vestibules have been

*Abstract of address before New England Street Railway Club, Boston, Mass., May 28, 1925.

set on a car and completely wired and fitted in one hour and 30 minutes.

A very great majority of our accidents are what are known as vestibule accidents, i.e., car collisions and car and vehicle collisions, front and rear end. The use of detachable vestibules permits a damaged car to be returned to service in a few hours instead of several days or weeks, depending, of course, on shop congestion, which is a serious question with us, all due to increased traffic conditions.

All of our schedules are plotted graphically before they are given over to the operating division. This enables us to correct errors in running time and to reduce the layover time at ends of line to a minimum.

By 9:30 o'clock each morning we have on our general manager's desk a graphic chart for each of the 68 individual lines comprising the Brooklyn surface system showing the receipts and time-table costs for the preceding day from midnight to midnight. This information is compiled by the night dispatcher at the surface depot and phoned to the transportation department dispatcher located in the main office building.

A set of such daily graphs for any given line over a period of months or years gives a very conclusive picture or prospectus of future traffic requirements.

Cross-section checks form another method used by us in establishing adequate service and proper distribution of short-line service and have proved a very successful method of arguing cases before legislative committees and regulatory bodies when attempts are made to compel the companies to extend their short-line service. These are made by taking checks simultaneously at various points along the line and establishing a 100 per cent loading point as well as the relative dropping off in riding to and from this 100 per cent point, and our schedules are then established to fit the needs as shown by such checks. The checks are made every 90 days or oftener if marked increases or decreases in daily riding, as shown by the daily receipt graphs, are noted.

In January we started an accident elimination contest by conducting meetings at our twelve surface depots. These meetings were addressed by our general manager, superintendent of surface transportation and the division superintendent.

It was pointed out to the men in graphic form just how the accidents of each type, on each line, were increasing, and also just what portion of each dollar in receipts was spent to pay for accident and injury claims. These pictures gave a comparison with the accidents of 1923 and 1924 and brought home vividly to each man the fact that more careful operation of his own car and anticipating the moves of the other fellow were essential to the reduction of accidents.

There were a total of 2,898 accidents on the Brooklyn Surface Lines in January, 2,197 in February, 1,958 in March and 2,212 in April, and these figures in themselves bespeak the value of the personal contact established at these meetings. In the matter of money expended the result has been most gratifying.

No reward has as yet been offered the men in this contest. The twelve depots are placed on a competitive basis, and each month a large card showing the standing is printed and distributed. The incentive thus established, to place their depot in first place on this graph, has been remarkable.

Car Cleaning Methods of Boston Elevated*

By O. B. Johnson
Inspector of Car Cleaning Boston Elevated Railway, Boston, Mass.

OFFICIALS of the Boston Elevated believe that car cleaning is essential to good repair and the keeping of the painted surface in good condition. The interiors of cars are cleaned daily. The floors, platforms and steps are sprinkled with disinfectant and the dirt from under seats, car sills and around fixtures is brought out where it can be reached with a broom or hand brush. This is then swept out with an ordinary broom. The interior of the car body and vestibule below the roof is dusted with an absorbent mop, with the exception of lamps, hand straps and window sills, which are wiped with a dry cloth.

Periodical cleaning is carried out once a month. At these times the entire interior finish of the car is washed with soap and water. Interior glass is cleaned at the same time and hand straps are disinfected by dipping in a jar of disinfectant. Upholstered cushions are cleaned by beating and curtains by wiping or brushing.

After every storm and at other times when necessary, the exterior of the car is washed all over below the roof. The team for exterior washing consists of a hose man and two brush men to rub. The hose man rinses after the rubbing. In this work it has been found necessary for the brush men to follow the hose closely, for if the surface has a chance to dry off the rubbing is less effective. When storage or other conditions prevent the use of the three-man washing team, a bucket and brush are used by a single man.

The painted exterior, together with signs, is washed with water and oil soap, using a sponge and brushes. Hunter signs, monitor and ventilator glass are cleaned once a month, by using soap, water, sponge and dry cloth. The outside of sign glasses requires more frequent cleaning during bad weather.

*Abstract of address before New England Street Railway Club, Boston, Mass., May 28, 1925.

Bus Regulation Arouses Lively Interest at Chicago

Control by I. C. C. of Interstate Operation Advocated at Mid-West Motor Transport Conference—Co-operation Will Prevent Needless Multiplication of Commissions—Economics of Bus Operation Discussed

UNDER the auspices of the National Automobile Chamber of Commerce, 200 representatives of the electric and steam railroads, the automotive and allied interests discussed transportation problems at the Mid-West Motor Transport Conference, Chicago, May 27 and 28. Keen interest was displayed in the subject of bus regulation.

Vesting power of regulation over interstate motor bus and truck operation in the Interstate Commerce Commission, which could redelegate that power to local agencies, was advocated by W. E. Dickinson, legal counsel Chicago, Rock Island & Pacific Railroad. The paper read was one which had been prepared by M. L. Bell, vice-president of the same company. Mr. Dickinson said in part:

"In view of the recent decisions of the Supreme Court holding that a state is without power to grant or withhold a certificate of convenience and necessity for the operation of a purely interstate highway carrier, it is probable that the next session of Congress will take some kind of action relative to this matter.

"Although overburdened with duties, isn't it better to intrust this regulation to the Interstate Commerce Commission than to create a new body whose views and duties and authority will perhaps conflict with those of the commission? As motor carrier problems are largely local, agents could be chosen to act for the Interstate Commerce Commission. Powers granted should be general, not too specific."

Mr. Dickinson was followed by Charles W. Chase, vice-president Chicago, Lake Shore & South Bend Railway, and president Gary Street Railway. An abstract of his address, "The Electric Railway and Highway Transport," will be found elsewhere in this issue.

Another speaker on the subject of regulation by the Interstate Commerce Commission was T. R. Dahl, vice-president the White Company. The position taken by Mr. Dahl was brought out in a paper he gave on "Is Regulation of Interstate Common Carriers Necessary?" This paper, which developed rather extended discussion, reviewed the action taken at meetings in Washington the week previous and urged congressional action giving limited powers to the Interstate Commerce Commission. The directors of the N.A.C.C., according to Mr. Dahl, would have the I.C.C. grant formal approval of certificates of public convenience and necessity. In case of disputes between the states the commission would act as a board of arbitration, but all other regulatory powers would be delegated to the state utility commissioners of the states where the operations were located. This solution,

he believed, would overcome constitutional objections and still place control of essentially local operations in the state commissions.

The general counsel of the Chicago, North Shore & Milwaukee Railroad, Ralph Bradley, favored the legislation suggested by Mr. Dahl. Federal legislation should not require the payment of any fees to the federal government for investigation or for certifying operating rights, Mr. Bradley insisted. All taxation of the motor vehicles used by the carriers should be left to the states. Bus regulation is essential, he said. Otherwise there will be an absence of system and of regular schedules. Service will be duplicated, highways unnecessarily congested and fly-by-night operators will multiply. Unless rates are regulated, the industry will be in chaos, he held.

Speaking against the plan to have the I.C.C. give merely formal approval to certificates issued by the state commissions was Judge S. T. Bledsoe, general counsel Atchison, Topeka & Santa Fé Railroad. This plan, he said, would give no regulation at all. Congress cannot constitutionally delegate the power of regulating interstate commerce to the states. Once certificates are issued under such a plan it would be impossible to get adequate service or to regulate rates. The real test of regulation was, he declared, "Does the public interest require it?" This involves the present railroad carriers and their ability to perform a satisfactory service.

The motor bus, the motor truck, the railroads are all common carriers, he held, and as such should be regulated. There is no reason for intrastate regulation and not interstate regulation. It would not be necessary for motor applicants to go to Washington for hearings. The I.C.C. could designate state commissions as its agents to hear cases, or could send examiners to take the evidence. At present the states have power to regulate with regard to adequacy of service. This is as it should be, Judge Bledsoe pointed out. But when it comes to interstate rates, the states do not have jurisdiction.

The Field of the Motor Bus and Its Economics

In the motor bus session two subjects were taken up—"The Field of the Motor Bus" and "Economics of Motor Bus Operation." John A. Ritchie, president Chicago Motor Coach Company, was the principal speaker on the first subject. He said in part:

"Co-ordination is economically inevitable. The most noteworthy step in that direction was taken when the Interstate Commerce Commission was formed in 1887. Whatever its errors may have been, and however much and however reasonably its acts may have been criticised, there is probably no railroad executive of importance today who fails to see the value of co-ordination in such measure as the Interstate Commerce Commission has been able to effect.

"The establishment of state public utility commissions is another step in the same direction. But these are all governmental agencies and one cannot but feel that if we could voluntarily and effectively co-ordinate the efforts of our own national transportation organizations it would be far better than to see more public commissions established.

Multiplication of Commissions

"Already the number of commissions having certain powers over public transportation is legion. Already their decisions, not infrequently at cross-purposes, have mounted into many volumes, and added to the expense and embarrassment of trying to find out the way of legal safety in any proposed action.

"Would it not be the part of wisdom to anticipate further regulation and adjust the differences of opinion and interest among ourselves rather than be forced by public pressure to adjust them in ways which might not be either agreeable to us or to the most useful ends of society as a whole?"

One Speaker Defends Competition in Transportation

S. C. Hadden, Indiana Highway and Motor Association, Indianapolis, conveyed the impression that he believed in competition in transportation, although he said that he would be for co-ordination, when defined "as the greatest economical use of all transportation facilities." However, he would not agree that operation paralleling railway lines should be prevented. The final arbiter, the public, wants competition in transportation, he maintained.

In Minnesota, according to E. F. Zelle, president Minnesota Motor Bus Association, a plan of co-ordination of bus lines was inaugurated with the formation of the association some few years ago. With from 85 to 90 per cent of the bus operators of the state now in the association, respect is given to the other fellow's routes. Mr. Zelle said that equipment used was valued at $5,500,000, that the routes covered 8,600 miles.

H. B. Stowe, superintendent of automotive equipment Department of Street Railways, Detroit, told of the manner in which buses were being operated in connection with the trolleys there. The department is not making away with the old form of transportation but is taking advantage of the new. It does not believe that the bus manufacturers are trying to force the railways to use something they do not want. Continuing he said:

"Since its inception, the D.S.R. has been studying the traffic and transportation problems of Detroit. We have considered many units and devices for co-ordinated transportation, such as the trackless trolley, the motor bus, and subway dips for the downtown business section. The rapid advances in the design of the motor bus brought about its adoption by the D.S.R. as one of the units of its co-ordinated system. In July, 1924, we began our first motor coach operation on Belle Isle. Later in the year we purchased 50 single-deck coaches of the 21-passenger type, to be used as feeders to the street car lines, giving much needed extensions to the outlying sections of the city, which had no means of transportation. A subsidy plan is now being worked out in detail to insure the department against losses through the operation of these extensions. This form of subsidy represents a guarantee to the Department of Street Railways to assume losses that may be incurred beyond the cost of operation in some of these extensions, and that reimbursement to the department shall be guaranteed by interested business associations in the several districts into which the lines are extended. To date we have received several checks from the Delray Business Men's Association to cover the operating deficit of that particular extension.

The subject of economics of motor bus operation, as it applies to bus operations in and around Milwaukee by the Wisconsin Motor Bus Lines, was covered in a paper by H. A. Mullett, assistant general manager the Milwaukee Electric Railway & Light Company.

Mr. Mullett said that his company now had storage space for 600,000 gal. of gasoline. By purchasing when the market is right a considerable saving in operating costs could be made, he averred. It was his experience that accidents in connection with bus operation were less than with the trolleys. He advised operators to adhere to as few standards of equipment as necessary, to care for the different kinds of traffic.

Several speakers discussed the subject of economics of operation. J. M. Pogue, Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, told of his bus operation between Dayton and Columbus. It was started with seven-passenger touring cars and has since developed into a substantial service using 22-passenger sedan type vehicles, with a seat for every passenger. On week days the load factor runs between 55 and 60 per cent. On Saturdays and holidays it varies from 85 to 90 per cent, and some trips have to be double-headed.

One of the significant facts, he declared, is that the combined passenger traffic on both railway and bus exceeds that previously carried by the railway alone. It is believed that some of the private automobile traffic is being secured. Fares are based on 3 cents per mile, with a minimum charge of 25 cents, and it is a surprise, Mr. Pogue said, to see how many minimum fares are picked up.

One of the biggest economies in bus operation, said B. W. Arnold, superintendent of bus service Chicago, North Shore & Milwaukee Railroad, is to acquaint the public with the costs of operation. Legislators now think that the one "gold mine" left is the bus. Two bills are now before the Wisconsin Legislature dealing with the buses, one would require a certificate of convenience and necessity for operation, and the other would increase taxes 25 per cent.

One strange thing about the regulatory bill is that the independent operators who four years ago so strenuously opposed the passage of such a bill now are the strongest for it. The reason for this is that since the passage of a similar bill in Minnesota some 38 operators have come into Wisconsin and started operation, often in competition with other motor carriers. These carriers now are among the strongest boosters for the bill.

Suburban operation of buses in co-ordinated service with electric railway cars was discussed by Bert Collett, general manager Chicago & West Towns Railway. This bus service connects the small western communities by north-side routes and eliminates roundabout riding on the company's cars.

The conference was honored by the presence of the Hon. W. M. Jardine, United States Secretary of Agriculture. In an address dealing partly with the work of his department and also with the influx of motor vehicles in this country, Secretary Jardine advocated the co-ordination of railroad, waterway and highway transportation. The purpose should be, he said, to develop each form to its highest point of usefulness without taking from another the functions which the other could perform to the better advantage of the public. We may help the motor vehicle to find its place by wise restraint of its more enthusiastic proponents and by refraining from regulation which may have a crippling effect. Traffic surveys made by the department in six widely separated states show there is no basis for the belief that the motor truck will compete seriously with the railroads, according to Secretary Jardine. The truck has found its place in the short haul and is not taking over any business that the railroads can do as well or better.

Sweeping changes in the way that the public will travel, and the revolution in the method of shipping goods were predicted by A. J. Brosseau, president Mack Trucks, Inc., in discussing the relation of highway transport to other transportation agencies at the opening session, Wednesday, May 27. Private passenger cars, motor buses and motor trucks serve not alone the public but the other and older transportation agencies as well, he declared. How to employ these instruments to the best advantage of all is the task which confronts operators.

Significance of Subsidized Bus Competition*

By CHARLES W. CHASE
Vice-President Chicago, Lake Shore & South Bend Railway, and President Gary Street Railway

THE main problem of the electric railways is to provide transportation for the people during some four hours of the day. The electric railways carry some 44,000,000 passengers per day and at least 20,000,000 must be taken to their destinations in four hours or at the rate of about 5,000,000 per hour. This is the real problem of the electric railways and I am convinced that there is no way of handling it except through the use of rapid transit trains, either elevated or subway, and large capacity surface cars.

The place of the bus, therefore, is not in competition with electric cars in carrying the rush-hour crowds. It seems to me it is in extending needed transportation service into territory where the home development is not sufficient to warrant the laying of rails and the stringing of wires. The bus also fits in supplying service to residential sections that do not now have rail service and which may not want noisy street cars operated on their streets.

The gravest menace to the street railway today is the highly subsidized motor bus competition, well organized and aided by abundant capital. Such a venture carries little risk and a good chance of quick profits. If the street railway of a community be unfortunate enough to have encouraged the displeasure of the political administration, it is a simple matter for persons, even unknown and untried in the transportation industry, to acquire a competing franchise. Then there are motor bus manufacturers who will advance against this franchise practically all of the capital necessary in the shape of buses. They will organize and supervise the business. The enterprise will start, planting its service along profitable routes of the street railway, preceding that service by sufficient time to secure the patronage and leave the railway to do the drudgery of all the unprofitable and pioneering service which the development of the community may require. In all, an economic waste and sheer duplication of service.

An instance, not far from Chicago, exhibits the strange spectacle of a city granting a 25 year franchise to such a competing motor bus service covering all of its streets and prohibiting by regulatory ordinances all competition from other buses and jitneys and even operation by the street railway itself of any protective motor bus service. This bus company is permitted to charge a 10-cent fare while the street railway is damned because with an 8-cent cash and 7-cent ticket fare it will not spend hundreds of thousands of dollars for street improvements, producing not a nickel of return to itself. It is true that the franchise requires the payment of 3 per cent of the gross receipts of the bus business to the city, but this must be expended in the maintenance of the streets used by the motor buses —an insignificant consideration for use, otherwise free of charge, of the enormous investment of the public in its streets.

This highly subsidized business—subsidized both as to free use of the public property and greatly increased rate of fare—can only succeed when the political and public psychology of the situation presents a fertile field for such a venture. But too many such situations do exist in our cities or can be easily engendered. It behooves us of the street railway industry, therefore, to be vigilant to maintain to the best of our ability sound public relations—thereby protecting ourselves from such forays. Constant efforts to study and meet the public desires and needs as to transportation and a spirit of accommodation will accomplish this, as has been abundantly demonstrated in many cities; even in one contiguous to the city first mentioned and in which the street railway and the city have been working hand in hand for complete and unified street railway and motor bus service, with the buses serving as feeders to the street railway lines and doing the pioneering transportation work in the thinly settled suburbs and parts of the city.

Would it not be better and productive of greater and more lasting returns, I wish to ask the motor bus manufacturer, for him to encourage, aid and protect by co-operative effort the street railway in its desire to extend and modernize its service by the use of motor buses as feeders, and do the pioneering transportation work, than to aid or countenance the questionable efforts of irresponsible persons to profit by the misfortunes of a particular street railway and to deprive it of its business by instituting a competitive and highly subsidized system of transportation, which assuredly cannot be of lasting tenure of life and must present an unstable foundation for profitable business relations with the manufacturer of motor buses?

*Abstract of a paper presented at the Mid-West Motor Transport Conference, Chicago, May 27.

Bus Session at Automotive Meeting June 18

THE morning of the third day of the four-day session of the Society of Automotive Engineers at White Sulphur Springs, West Va., June 16 to 19, will be devoted to discussion of gasoline-electric buses and rail car design. On the morning of June 18 H. S. Baldwin, General Electric Company, will read a paper on "An Electric Drive for Gasoline Buses."

American Association News

Special Reports Available

THE following special reports have been prepared and are available to member companies in good standing upon request:

Bulletin No. 26. Motor Bus Decisions. A summary of court and commission decisions made under existing laws involving motor vehicle common carriers, both passenger and freight, covering such subjects as jurisdiction and powers of commission, issuance of certificates of convenience and necessity, abandonment, extension or modification of routes, service requirements, etc., preceded by an analytical index making possible ready access to decisions on all phases of motor vehicle operation.

Bulletin No. 27. Traffic Ratios—1924, Part I, City Lines. This is a tabulation of ratios and comparative unit figures derived from the operating reports of electric railways in 1924. The cities are grouped according to their size, and there is shown in each city the riding habit, the average speed, revenue passengers and car-miles per mile of track, per car operated, revenue per mile of track, operating ratio, passengers per car-mile, proportion of transfer passengers and operating income per mile of track.

Bulletin No. 28. Traffic Ratios—1924, Part II, Interurban Lines. A tabulation of data for interurban lines similar to that given in bulletin No. 27 for the city lines. For the interurban lines the data includes the average speed, revenue passengers per car-mile, per mile of track, per car operated, operating ratio, revenue per mile of track, and operating income per mile of track.

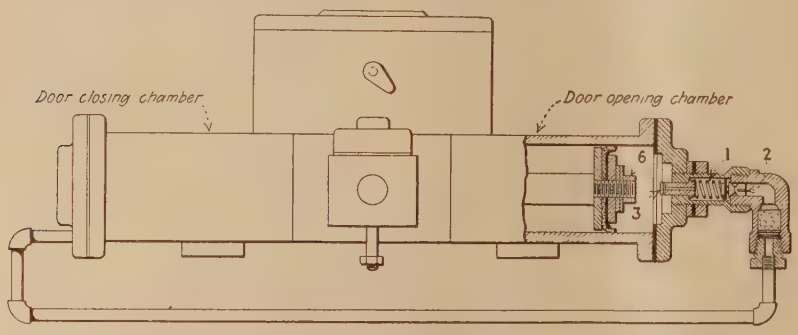
Bulletin No. 29. Motor Bus Operations in the United States, Part V. This is the fifth installment of a list of motor bus lines, the first part of which was issued Dec. 1, 1924. It shows the name and address of all motor bus operators, and where the information is available, statistical data on the character of their operations. The present installment covers the states of Alabama and Oregon.

In addition to the above supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies, Bulletin No. 30, have also been prepared, bringing them down to date.

Maintenance of Equipment

By-Pass for Door Engines

WHEN the closing movement of an air-operated door is stopped pressure builds up in the closing chamber in certain types of door engine, so that when the door is released it will slam. Should the door movement be interrupted through a passenger being caught, this increased pressure prevents withdrawal and may result in injury. To insure that the closing pressure will not become excessive, a by-pass safety valve is being installed on cars of the New York State Railways, which have air-operated doors with door engines. This arrangement was devised by H. S. Sweet, engineer of equipment for the railway.



This By-Pass Safety Valve Used on Door Engines on New York State Railways Prevents Slamming

In arranging door engines for use with the by-pass safety valve, a new head is installed on the door-engine opening chamber and the by-pass mechanism attached at this end with a pipe connection to the door-closing chamber. The device, together with the necessary piping, is shown in an accompanying illustration. With this attachment installed, if a person is caught between the jamb and the door while it is closing, pressure will build up in the door-closing side of the engine until it has reached the pressure for which the spring No. 1 has been set. On the New York State Railways this is about 35 lb. Any greater pressure will cause valve No. 2 to open against the spring pressure. Air from the door-closing side of the engine will then flow through valve 2 and port 3 into the door-opening cylinder, which is connected to atmosphere for the closing operation. The pressure of 35 lb. is small enough so that a person can readily be released as the door can be shoved back against this pressure easily. Also, after the movement of the door is allowed to continue, it closes at its normal speed, since excess pressure in the closing chamber does not result.

When the door has once closed, the mechanism also provides that full pressure on the door-closing cylinder is applied to prevent the door from being forced open. In closing, nut No. 6 on the piston presses against valve stem No. 3. This increases the tension of spring No. 1 sufficiently to prevent the door being forced open while in the closed position.

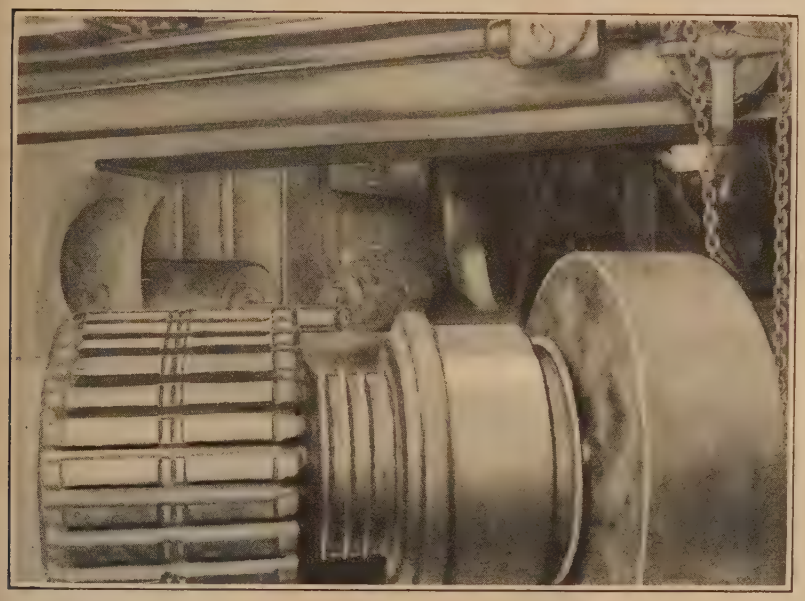
Sling Used to Raise Birney Car Body

LIGHTWEIGHT safety car bodies are raised from their trucks in the Campello shops of the Eastern Massachusetts Street Railway, Brockton, Mass., by an arrangement of a sling and chains as shown in the accompanying illustration. A 5-in. T-rail is the central member of the framework of the sling. Diagonal members crossing at the center are 2¼-in.x3-in. angles. These are separated at their ends by 4¼-in.x2¾-in. angles. At the four corners of the sling are chains which pass under the car body. The shop is equipped with a Niles overhead traveling crane, which has ample capacity to raise the sling after it has been adjusted to a car body. In order to remove a car from its truck it is necessary only to attach the sling and pick it up with the crane. The truck can then be pushed out and the car body lowered onto supports.

Overhead Crane in the Campello Shop of the Eastern Massachusetts Street Railway Picks Up Light-Weight Car Bodies from Their Trucks

Installing Commutator Segments in Railway Shop

ON THE Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., it is the practice, whenever possible, to install new segments in worn commutators rather than to buy entirely new commutators or send them to manufacturers for repairs. It very often happens that most of the segments are in good condition and that only six or eight need replacement. New segments are purchased from the manufacturer and installed in the company's shop. How this has been done on the armature for a Westinghouse 510 motor is shown in an accompanying



New Segments (Marked In White) Installed on Westinghouse No. 510 Armature Save Buying New Commutator

illustration. Six new segments are marked in white. To make repairs a couple of turns of wire are wrapped tightly around the commutator, after which it is removed carefully from the shaft and the new segments are installed at the bench. High segments are turned down in a lathe after the commutator has been reinstalled on the armature shaft. The winding is done in the spare time of a shop man when not occupied with other duties. It is thought by the management that this method has considerably reduced the cost of commutator repairs.

The following is an outline of a method recommended by the Westinghouse company for doing this class of work. The operations are given in the order in which they should be followed:

1. Fit the front metal V-ring over the metal bushing, or spider. It may be necessary to do some filing to obtain the proper clearance.
2. Fit the ring nut on the bushing. It may be necessary to clean out the threads on the bushing and nut to allow ring nut to be screwed up by hand.
3. With the front V-ring placed over the bushing and the ring nut screwed up tight, check the clearance of the front V-ring over the nut by lifting it up against the under side of the nut.
4. If it is a bolted type of commutator, the same procedure as indicated should be followed.
5. Dismantle the metal parts and scrape off all the paint and dirt. This applies especially to the V's.
6. Clean out the V's in the assembled copper segments, using fine sandpaper. Thoroughly blow out all dust and dirt and check for short circuits, using 500 volts between bars. After testing, brush the inside of the V's with a very thin coat of clean shellac.
7. Thoroughly clean the mica V rings, especially at the fit of the V, using fine sandpaper.
8. Assemble all parts and draw up ring nut as tight as possible while cold.
9. Cut off the temporary band wires holding the segments together, and further tighten up the ring nut.
10. Check for the alignment of the center line of commutator bar or mica (as given on commutator drawing) with respect to the center line of the keyway in the bushing.
11. Heat the commutator to a temperature of from 125 to 150 deg. C. and press while hot at from 20 to 30 tons, depending upon its size.
12. While hot and under pressure, further tighten up on the ring nut, after which remove the assembled commutator from the press to cool.
13. When cold, check for short circuits, using 500 volts between bars.
14. Check for grounds, using 4,000 volts alternating current if possible.
15. Press onto the armature spider, or shaft, and true up the face and neck.
16. After soldering, undercut the mica approximately $\frac{3}{64}$ in. deep.

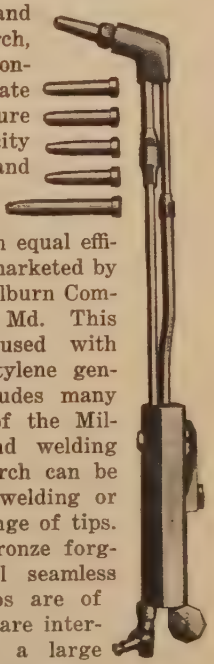
The following points should be considered:

1. Use a good reliable make of mica insulation. Some grades look good on the surface, but are built up with an inferior bond which allows the pieces of mica to squeeze out under pressure. With this grade of mica it is often impossible to use these parts again.
2. Tighten commutator under pressure while hot.
3. If an oven is not available, it is preferable to heat the commutator on the inside, using a gas ring.
4. In tightening the ring nut, use a wrench rather than a hammer and chisel, as these destroy the nut.
5. If for any reason the commutator segments have to be removed after the bands are cut, a three-part clamping ring can be used to hold them together.
6. Do not fail to keep the commutator undercut, $\frac{3}{64}$ in. maximum; $\frac{1}{64}$ in. minimum; the front V ring clean and well painted; the commutator free from oil; the rear of commutator sealed from dirt and moisture; the commutator tight; the face of commutator smooth; the neck full width; the mica extending $\frac{1}{32}$ in. at rear, and segments free from grounds and short circuits.

New Equipment Available

Combination Low and High Pressure Torch

A CUTTING and welding torch, especially constructed to operate with low pressure acetylene gas, city gas or hydrogen and which will operate on high-pressure gas with equal efficiency, is being marketed by the Alexander Milburn Company, Baltimore, Md. This torch can be used with low-pressure acetylene generators and includes many standard parts of the Milburn cutting and welding torches. The torch can be used for either welding or cutting by a change of tips. It is made of bronze forgings and special seamless tubing. The tips are of solid copper and are interchangeable with a large number of low-pressure torches of other makes.



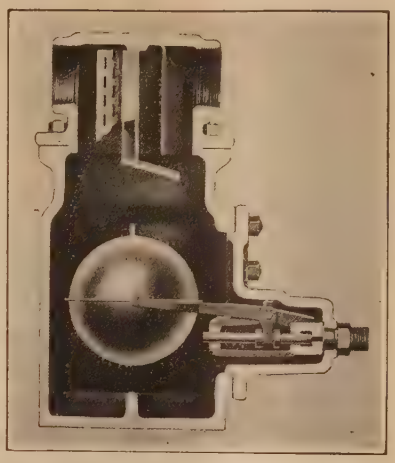
Starting Switch for Shop Motors

FOR controlling a.c. shop motors of not more than 10 hp., the Electric Controller & Manfacturing Company, Cleveland, Ohio, has placed on the market a push button operated starting switch. The contacts are oil-immersed and close the circuit directly across the line. The switch is arranged for wall mounting and is housed in a pressed-steel case with removable top cover. The contactor and overload mechanism is mounted on a slate base fastened to the case. The oil tank for immersing the main and overload contacts is suspended from the case by slotted spring clips. These permit the tank to be lowered part way for inspection and adjustment of the contacts. The operating coil is mounted on the core and is front-connected.

The new starting switch, called type ZO, has an expansion wire type of inverse time element overload device, used by the manufacturer on other starters. Current in the wires causes them to expand until a certain temperature is reached, when the contacts trip. If a momentary overload occurs, the wires begin to lengthen at once. If the overload goes off before the wires have lengthened enough to trip the contacts, they quickly return to their normal-load length. The overload device is adjustable. It is inserted during both starting and running. The time element characteristic makes it possible to protect the motor for the continuous running current and also for the higher current during acceleration. In case the motor does not start, due to abnormal load conditions or to the loss of one phase, the overload device will function so as to open the circuit in less than five seconds from the time the contacts are closed.

Removing Water from Air Lines

WATER in compressed air is a source of trouble in all electric railway shops. It cakes the sand and chokes the feed in sandblasting machines. It spoils air-brush painting. It slows down the operation of air-operated tools and causes rapid wear and rusting of parts. Water collects in pockets in piping and loosens pipe scale, rust and dirt from the inside of pipes, which form a further source of annoyance and trouble. In cold climates freezing



Valve for Separating and Automatically Discharging Water from Air Lines

results. To separate and discharge the water from air lines automatically, a device known as "Dri Air" has been placed on the market by the New Jersey Meter Company, Plainfield, N. J.

This device is arranged for installation at any convenient point in the compressed air line and is recommended at inlets and outlets particularly. Separation of the water from the air is effected by the use of baffles and traps such as are used in steam separators. This includes a reduction in the velocity of air and a change in direction. The construction provides a channel to carry and direct the water so that it can be automatically removed.

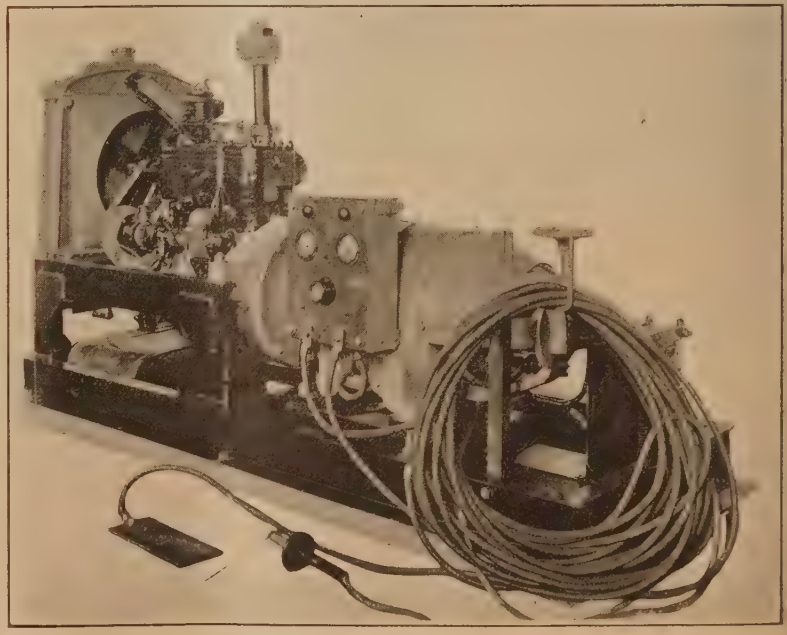
The device is drained by means of a float-operated valve as fast as the water collects. This eliminates the necessity of having a man go around at intervals to open drain valves. The separator and water trap are combined into one fitting. The discharge valve is operated by means of a self-baling and non-collapsible copper float. As the float does not need to withstand a high collapsing pressure, it is light and powerful enough to operate a valve with large openings and high lift, giving a large discharge capacity. Internal parts are of bronze or copper to eliminate corrosion. The discharge valve is so located as to guard it from grit and dirt.

Engine-Driven Welding Set

AN ENGINE-DRIVEN welding set which consists of a standard WD-12 welding generator driven by a Buda engine, all mounted on wooden skids to facilitate moving from place to place, has recently been added to the General Electric line.

The engine is a Buda model WTU, especially designed for heavy duty. It is a four-cylinder, four-cycle machine of "L"-head type, with 3¾-in. bore and 5½-in. stroke. The S.A.E. rating is 22.5 hp., and at 1,400 r.p.m. the actual brake-horsepower is 33.

The new outfit is being marketed complete with all accessories and ready for use. This unit should be of value in repair work and on any construction job where electric power is not readily available.



Welding Generator Driven by Gas Engine

The News of the Industry

Oakland Report Filed

Hearing on July 2 to Consider Suggestions Contained in Report of Engineers

Engineers have completed the traffic survey of the traction division of the Key System Transit Company, Oakland, Cal., and have filed their report. They recommend a comprehensive loop system and rerouting in the downtown section of Oakland designed to relieve existing congestion and speed up traffic.

A decrease in the number of stops between Oakland and other points in the East Bay has also been recommended, together with changes in equipment and the installation of a traffic bureau to continue the joint survey.

The survey was started in January, 1924, when the Key System Transit Company engaged the services of Richard Sachse, consulting engineer. On learning of this the city of Oakland asked permission to join in the survey. This request was readily granted. It was also suggested that the State Railroad Commission co-operate in this matter.

The commission was willing to do this, but to secure its official participation it was necessary to have the city of Oakland file a formal complaint citing the need of a joint survey.

Shortly after the survey started the company agreed to make any changes recommended without awaiting the completion of the task of the engineers. As a result new bus lines were installed in districts now without adequate transportation. Additional cross-town bus lines were also put into operation.

New Loops and downtown rerouting recommended by the engineers in their survey will mean the expenditure of about $85,000 for new construction and about $30,000 for reconstruction.

One hundred cars of the traction division were found to be unsatisfactory for rebuilding and the engineers recommended that 30 new cars be purchased immediately and that about 30 more be bought each year until the obsolete equipment is replaced.

It was further recommended that stops be spaced as nearly as practicable eight to the mile instead of about thirteen to the mile at present. Still further to speed up Berkeley-Oakland traffic it was recommended that Shattuck Avenue be used for semi-rapid transit service with a maximum of six stops to the mile between the main business sections of the two cities. A non-stop bus service was also suggested as an alternative plan. The surveyors, however, pointed out that the proposed revision in the number of stops will speed up service 20 per cent.

These recommendations were brought before the State Railroad Commission on May 28 for action.

The Oakland Chamber of Commerce announced that its engineers had not had sufficient time to study the report and requested an adjournment until July 2. This was granted by Commissioner Clyde L. Seavey.

After the contents of the survey had been made public President C. O. G. Miller of the Key System Transit Company said in part:

> As some people have misunderstood this situation and have consequently laid importance upon this investment of $85,000 new capital, we beg to mention that the annual report of the company for 1924 shows a total expenditure in roadbed and equipment exceeding $1,085,000 that year—the first of operation under the present administration.
>
> The committee has recommended the purchase of 100 new cars over a period of three years, 30 cars to be ordered upon the approval of the report. This will add approximately $450,000 to the company's capital expenditures during the coming year.
>
> The company expects to go forward with this despite totally inadequate returns on its investment, but in doing this it seeks the help and co-operation of all the communities it serves. The Railroad Commission has the report of the engineers under advisement and whatever recommendations contained in the report are approved by the commission will be put into effect as rapidly as possible following the granting of the necessary permits by the city of Oakland.

Five-Cent Fare Plan Scotched

Hylan's Transportation Board Finds Five-Cent Fare Plan for New Transit Lines Impossible Without Heavy Assessment Against Realty—Report Regarded as Robbing Mayor of Sole Issue in Coming Fight

IN A lengthy report made public on May 29 the Board of Transportation of New York City warned the Board of Estimate that it will be impossible to finance the construction of Mayor Hylan's comprehensive municipal subway system and operate it on the basis of a 5-cent fare unless an assessment of approximately $325,445,000 is levied against private real estate in the city. The total cost of the subways is estimated at $542,915,000.

The Board of Transportation further stated that if Mayor Hylan and the Board of Estimate adopted this plan, which appeared to be the only feasible 5-cent fare plan available, the total of $325,445,000 should be so divided that $138,445,000 would be levied in direct assessments against the owners of real property in the areas benefited by the proposed subways and $187,000,000 would be levied against the real property of the city at large. The latter sum would be provided for in the budget and collected in the form of taxes over a period of eight years.

The actual route of the proposed Hylan subway system is 57 miles, with an actual trackage of 170 miles. This latter figure is the result of the total trackage for two-way and express service over the various routes.

Taxation Hardship Likely

The Transportation Board, consisting of John H. Delaney, chairman; Daniel L. Ryan and William A. DeFord, all of them appointees of Mayor Hylan, has based its report on the presumption that the entire Hylan subway system would be built. The board points out, in commenting on the assessment method of financing this system, that the alternative of financing the construction through bonds would be equivalent to operation of the lines at an 8-cent fare.

Furthermore, the report points out the almost utter impossibility of financing the new subways by 50-year bond issue because the borrowing capacity of the city will not permit it unless all other public improvements, including new schools, ordinarily financed by 50-year bonds, are completely abandoned during the next five years. This would result in a taxation pressure as early as 1928 more distressing than the present transit situation.

The law fixes a 5-cent fare for the first three years of operation and a self-supporting fare after that period.

To do this, the report points out, it will be necessary partly to finance the subway out of the budget and partly by property value assessments. Here is the case in a nutshell:

The estimated cost of construction and equipment of the proposed new subways, prior to beginning of operation, is $506,765,000.

All that the returns from a 5-cent fare could take care of in the way of paying interest and amortization on 50-year bonds, after paying operating costs and depreciation, would be $243,000,000, and any outstanding indebtedness in excess of that sum would have to be financed otherwise. It amounts to this:

The subways can take care of, on a 5-cent fare basis, an indebtedness of	$243,000,000
Leaving a balance to be handled otherwise of	263,765,000
This would be divided as follows:	
Out of taxation	110,000,000
By property assessments	138,445,000

It would be necessary also to provide for about $77,000,000 additional expense for new equipment after the fourth year out of taxation, and to levy additional property assessments as required for expenses which are sure to arise.

Chairman Delaney insists that the short term serial bonds to be included in the budget would not increase taxa-

tion. They would be issued in series to be paid off in the next eight years.

As for the plan of levying assessments against properties benefited by the new subways, Chairman Delaney cannot see any objection to it. He points out that property owners have volunteered in some parts of the city to pay the entire cost of construction of subway lines abutting their holdings. The board has the power to assess any part of or all the cost of subways upon benefited property.

Experience has shown, according to the report, that financing the entire project by 50-year bonds would add about 15 per cent to the cost of construction. The following conclusion is reached after an exhaustive presentation of the proposition from all angles:

> The rate of fare for each passenger can be permanently maintained at 5 cents if all the capital required during the construction period in excess of $214,700,000 be provided by issuance of short term serial bonds and a moderate assessment on property directly benefited by the new lines. By this method of financing the interest charges during construction will be approximately $40,000,000 less than if the whole project is financed by issuance of 50-year bonds. When the interest charges are included the total investment under this plan would be $542,915,000.

The capital invested under each plan would be approximately as follows:

FIVE-CENT FARE PLAN	
Cost of construction and equipment for initial operation	$506,765,000
Cost of money prior to initial operation	36,150,000
Capital investment at beginning of operation	$542,915,000
EIGHT-CENT FARE PLAN (FIFTY-YEAR BONDS)	
Cost of construction and equipment for initial operation	$506,765,000
Cost of money prior to initial operation	76,015,000
Capital investment at beginning of operation	$582,780,000

The report says the capital with which to finance the construction and equipment of the new system in a manner that will permanently establish a 5-cent rate of fare can be obtained from the following sources:

Sale of fifty-year bonds	$214,470,000
Sale of serial bonds maturing in annual instalments during the next eight years	187,000,000
Assessment upon property benefited in the areas contiguous to the new lines	138,445,000
Already provided in budget of 1925	3,000,000
Total capital necessary	$542,915,000

The report says this plan appears to be wholly practicable in its apportionments. The report is accompanied by a detailed exhibition of costs of construction and operation of twenty-seven different sections of the proposed lines embracing 170 miles of single track, of which five, extending up Central Park West from 64th Street and out into Washington Heights, have already been authorized by the Board of Estimate. Approval is asked for the twenty-two lines not already validated.

Chairman Delaney suggests that the city might save $25,000,000 original cost of a power plant and the interest on the investment by purchasing power from a contractor.

H. U. Wallace Succeeds Ross Schram

H. U. Wallace, general manager of the Knoxville Power & Light Company, Knoxville, Tenn., has been appointed general manager of the Department of Street Railways at Detroit, Mich., succeeding Ross Schram. Announcement to this effect was received by wire from Detroit at 5:30 p.m. on Friday, June 5, just as the issue of the ELECTRIC RAILWAY JOURNAL for June 6 was being put to press. The telegram contained no facts other than the statement of the change.

"Is Arbitration Arbitrable?" Question at Boston

The Boston Elevated Railway, Boston, Mass., and its union men are in flat disagreement. Recently, the company proposed a change in the existing method of arbitration by which the company has chosen one arbiter, the men another, and these two a third. The men rejected this proposal.

The public trustees in charge of the elevated have now made public a letter signed by James F. Jackson, chairman of the elevated trustees, in which it is stated that the trustees declined to acquiesce in the attitude of the union men. The trustees, in their statement, suggest that each party name its own representative and the selection of the third, or "neutral" member, be left to the Governor of the commonwealth. The company has already named Roland W. Boyden as its representative, and the men attorney James H. Vahey, on the assumption, their representatives say, that the two men thus named were to name the third, or "neutral" man, and the board consider only disputed questions on which they have not been able to agree in negotiation, but not the method of arbitration, as they assert they are perfectly satisfied with the method in operation between the parties for the last thirteen years. The parties for the last thirteen years.

Wages Reduced in Sioux City

Because of falling revenues, the Sioux City Service Company has announced a reduction in the wage scale of its employees of 6 cents an hour, effective June 1. This change reduces the pay of the majority of the men to 50 cents an hour from 56 cents an hour. First year men will receive 45 cents an hour, second year men 47 cents an hour and third year men 50 cents an hour. Overtime work will be paid for at the rate of time and a half. For classes of labor other than trainmen, a reduction of 6 cents an hour will be in effect. The men are demanding an increase of 6 cents an hour more. No further retrenchment was possible without impairing the service to the public.

Pay-as-You-Leave Experiment at Oakland

An experiment with the pay-as-you-leave system will be made by the Key System Transit Company on its College Avenue line, between Oakland and Berkeley, Cal., beginning June 10.

Under this plan passengers will board both front and rear doors of cars on outbound trips and leave by the rear door, paying their fares as they pass the fare box. On the inbound trips, from Berkeley toward Oakland, the regular pay-as-you-enter system will be used.

Twenty-Mile Road Makes Record

All the rolling stock owned by the Lehigh Traction Company, Hazleton, Pa., was in operation from early Saturday morning, May 30, until early Sunday morning. Not one failure was reported. All of the men reported for work and no delays took place.

Up to June 1 returns had not been completed, but indications were that 43,000 fares were collected, this including passes, transfers, metal tickets and cash. In other words, this 20-mile line was asked to carry 125 per cent more people on May 30 than it carries on any regular day in the year. Best of all, the feat was accomplished successfully.

Approximately 19,500 people visited Hazel Park.

Claims Desired Fare Will Meet Expenses

O. S. Johnson, vice-president of the Plattsburgh Traction Company, appeared before Public Service Commissioner Voorhis on May 27 in support of the company's petition for consent to increase the fare to 10 cents, with sale of three tokens for a quarter. He informed the commissioner that the Common Council of Plattsburgh had unanimously consented to the increase.

Mr. Johnson submitted figures to show the deficits encountered by the road in the last few years, while it was owned by the Delaware & Hudson Company. The company decided to abandon the property in March and it was bought by Messrs. Johnson and O'Brien to save it from being scrapped and to give the people of the city transportation. Mr. Johnson stated that with the proposed fare it was expected the road would about pay operating expenses, without any return on the investment. It is proposed that the 10-cent fare should apply to the entire line, but that tokens would be accepted within the city limits.

Portland Council Will Consider New Franchise

Franchises to run seven years under which the Portland Electric Power Company, Portland, Ore., will operate railway and bus lines to portions of the city not now served will be considered by the City Council shortly. The franchises have been completed after weeks of work on the part of John M. Mann, Commissioner of Public Utilities, and F. I. Fuller, vice-president of the electric company. Fares are to be fixed by the Public Service Commission.

The bus franchise provides that every bus shall have a capacity of at least fifteen persons and shall be operated at least every 30 minutes. Franchise fees for the bus lines will be $1 a seat a year and a flat annual fee of $10. Transfers must be provided between the bus lines and the railway lines and from the car lines to the bus lines.

Recent Bus Developments

Detroit Proposes Unusual Test—Union Street Railway Seeks Bus Monopoly—Experiment in Montreal—Activity Reflected in Other Cities

THE Union Street Railway, operating railway and bus lines at New Bedford, has bought the Interstate Bus Line and Providence Touring Company, which have been operating buses connecting New Bedford, Fall River and Providence. The railway is seeking to clear this field of bus competition and to have the rights of its own interstate bus line extended so as to do business between New Bedford and Fall River. It has filed a petition with the Massachusetts Public Utilities Department for authority to parallel its trolley line from New Bedford to Fall River with a bus line, so as to give the people a choice of service. H. H. Crapo, president, says that the people demand a bus service and if they cannot get it from the railway they will get it in some other way.

The petition is opposed by the Eastern Massachusetts Street Railway on the ground that the two railways have a joint operating agreement out of which the Eastern Massachusetts gets a sum of about $60,000 a year. Fred Cummings, vice-president of the Eastern Massachusetts, and Philip G. Carleton, attorney for the company, argue that if the Union is allowed to supplement the railway with a bus line it will cut down the service over the trolley line and to that extent impair the income of the Eastern Massachusetts, while all the profit from the bus line will go to the Union Street Railway.

President Crapo admits that the new move will hurt the Eastern Massachusetts financially, but replies that such fate is inevitable in the development of the bus.

The New Orleans Public Service, Inc., New Orleans, La., has added two more bus lines to serve as feeders to the railway in the thinly settled sections of the city. The Commission Council of New Orleans has given it a franchise to operate a bus line on Canal Boulevard between City Park and Taylor Avenues, a distance of eight-tenths of a mile, and also a franchise to operate a bus line for a distance of 2 miles in Gemtilly Avenue. The establishment of several other bus lines is in contemplation.

The first proposal of the People's Motor Bus Company of St. Louis, Mo., to co-ordinate its service with the cars of the United Railways was made at a meeting of the St. Louis Board of Public Service on May 26.

Richard W. Meade, president and general manager of the bus company, in opposing a permit to the St. Louis Bus Company, a subsidiary of the United Railways, to operate buses over DeBaliviere Avenue to the Municipal Theater in Forest Park, said that his company was willing to give the opera patrons who visit the theater during the twelve weeks beginning May 25 unified service by furnishing a transfer to the street cars on payment of a 10-cent fare, or to furnish service on the buses exclusively for 3 cents between the theater and DeBaliviere Avenue. The latter plan would enable street car patrons to ride on the cars for the customary 7-cent fare and then take a bus to the theater for an extra 3 cents. Mr. Meade contended that this plan would do away with such congestion as would undoubtedly be caused by competing buses and would give the public maximum service.

The Interstate Public Service Company started a parlor car bus service between Indianapolis and Louisville on May 20. This run parallels and supplements the service given by the same company with electric railway cars. It is made with a fleet of five Fageol parlor cars. Although the Interstate has operated buses between Indianapolis and Franklin and between Indianapolis and Seymour, and also between Scottsburg and Louisville, until now these routes were not connected. The new service is in addition to the local service. The fare is the same as on the railway, namely, $3.50, one way.

The Oklahoma Corporation Commission refused to grant an application for operation of a passenger bus line between Oklahoma City and Norman on May 12, holding that the present interurban service given by the Oklahoma Railway fully meets the demands of the public between these points. The commission also refused to grant application for a passenger motor bus certificate to operate from Oklahoma City to Cushing, holding that the service given by the Missouri, Kansas & Texas and Sante Fé railroads between these towns is sufficient.

Col. J. E. Hutcheson, vice-president and general manager of the Montreal Tramways, Montreal, Que., has announced that a supplementary bus service will be tried out in Montreal within the next three months. The Montreal Tramways Commission and the Montreal Tramways have been studying the subject for a long time. Colonel Hutcheson said that among the difficulties which the bus would encounter in Montreal were the narrow streets, steep grades, sharp curves and heavy precipitation of snow. The company is prepared to start tentatively a bus service from Sherbrooke Street west to Pine Avenue that will provide accommodation for those wishing to visit the hospital and for those who prefer a bus to a tramcar. The company is also giving consideration to the operation of a bus service between Verdun and the corner of Atwater and St. Catherine Streets as soon as the streets of this route are put in good condition.

Application for routes and rates has been filed with the Minnesota Railroad and Warehouse Commission, under the new state law, by the Mesaba Railway Coach Company of Virginia, Minn., and the Northland Transportation Company, Duluth. Incidentally a $250,000 deal is revealed by which the Mesaba company took over the routes of the Range Rapid Transit Company between Virginia and Eveleth, Eveleth and Leonidas and Aurora and Hibbing. The Northland bought the Rapid Transit Company routes from Duluth to Virginia and Virginia to International Falls, effective on June 1. The owners of the Mesaba company operate trolley cars along the Iron Range of the Mesaba Electric Railway and will adjust bus routes and cards so that the two services will alternate every half hour. The Range Rapid Transit Company is a pioneer in bus operation on the Mesaba range.

The Denver & Interurban, (Kite Route) Railroad, operating between Denver and Boulder, Colo., 30 miles, has asked for permission to operate a bus line between these cities and all intermediate points. The new service would compete with its own electric line and the Colorado & Southern Railroad, which owns the Kite. The Kite sets forth that its receipts are diminishing and that unless the loss is offset the railway cars may be taken out of service. Many applications from outsiders for the privilege of operating buses over this route, have been refused because of the fact that it would take too much revenue from the rail lines.

Detroit Proposes Unusual Test

AS A RESULT of a proposal by Ross Schram, general manager of the Department of Street Railways at Detroit, to the Mayor's Committee on Transportation the municipal electric railway and the Detroit Motorbus Company will cooperate in a test to discover how well motor buses can handle mass transportation. Mr. Schram has proposed that the department remove its cars from Woodward Avenue, which cuts the heart of the business district and has the Ford Highland Park plant at the other end, and that the Detroit Motorbus Company take all of its equipment for service on Woodward Avenue.

It is Mr. Schram's opinion there is no more beneficial clinic to be held in transportation than a test of this kind. Volumes and volumes are being written pro and con on "Motor Car vs. Trolley." Mr. Schram's own staff has given endless attention and thought to the matter. To him there seems to be no answer except actually to make the test.

This proposal has the approval of the Mayor's Transportation Committee, the Street Railway Commission, and the directors of the Detroit Motorbus Company. In this connection Mr. Schram has suggested to Mr. Storrs, managing director of the advisory council of the American Electric Railway Association, that it would be very appropriate for the association to participate by having at least four or five observers present to study the proposed operation.

Barr Bill Lost

The Barr bill in the Illinois Senate, providing for indeterminate franchises, is apparently a dead issue. Senator Barr recently announced that he would not press the Legislature to act on the measure. The Barr bill and a rival measure were voted out of the Senate public utility committee.

Senator Barr said that the principle of his bill was not opposed but differences of the manner in which the permits will be issued and safeguarded made it unwise to press the issue at this time. He is working on a new measure to authorize a committee to visit other states and investigate their handling of utility problems with the purpose of recommending action at the next General Assembly.

The House committee has recommended the Durso bill. This measure provides for a transportation board in Chicago with home rule in traction matters.

Arbitration in New Orleans

Because negotiations which have been under way since May 1 looking toward a settlement of the wage to be paid trainmen of the New Orleans Public Service, Inc., New Orleans, La., for the year beginning July 1 have been unsuccessful, arbitration is to decide the issue. Francis Williams will be the arbitrator for the employees. The men have asked for an advance in wages of approximately 10 per cent. The agreement under which the men are working calls for a scale of 47 cents an hour for the first six months, 49 cents for the succeeding six months and 51 cents thereafter. The company, it is said, is seeking certain reductions.

One-Man Car Law Attacked

The Knoxville Power & Light Company, Knoxville, Tenn., has brought action in the Chancery Court attacking the constitutionality of the state law forbidding the operation of "one-man" cars. The suit was brought by Charles T. Cates. He says that at the time the legislature passed the act the Knoxville company had 51 one-man cars and had just bought sixteen new ones at a cost of $135,000. The measure is attacked principally on the ground that it contains an arbitrary classification in which cities under 30,000 population are exempted. It is contended that the operating costs of the Knoxville company will be increased at least $115,000 a year if it has to employ two men on every car. The law prohibiting one-man operation becomes operative on Oct. 16, 1925.

Arbitration Sought by Worcester and Springfield Men

Employees of the Springfield Street Railway and the Worcester Consolidated Street Railway on May 29 asked that differences respecting wages and working conditions be submitted to arbitration. They named James H. Vahey as their choice for representative on the board. The agreement under which the men have been working expired on June 1. The request for arbitration was presented in writing after several fruitless conferences had been held. The men ask for 80 cents an hour in place of 68 cents for uniformed men on two-man cars. The company proposed a reduction of pay, but has been especially insistent on a change in the working conditions, to include a wider range of hours in place of the existing eight-in-eleven spread. In the event of arbitration proceedings the company demands a board of five members instead of three as hitherto. The men filed their request for arbitration as the 60-day limit for such action was about to expire. All hope has not been abandoned of reaching an agreement by direct conferences between the parties. Another joint meeting will be held before papers are signed submitting the dispute to arbitration.

News Notes

Authorizes Fare Advance.—Authority to the Omaha-Council Bluffs Street Railway, Omaha, Neb., to boost its fare so as to provide an additional annual revenue, totaling between $300,000 and $350,000, has been granted by the Nebraska Railway Commission. Company officials predict an increase in fare from 7 cents or 4 tickets for 25 cents to a cash fare of 10 cents or 3 tickets for 25 cents.

P. R. T. Case Reopens July 1.—The Public Service Commission has fixed July 1 as the date for resuming the Philadelphia Rapid Transit Company's rate case in Philadelphia, Pa. The hearing will be resumed where testimony was suspended, the commission planning to hear several experts who could not be heard the last time the case was aired. Dr. Milo R. Maltbie, called into the case by the commission at the request of Governor Pinchot, will attend the hearing. Dr. Maltbie recently announced that a revaluation would be necessary for the commission to determine the proper fare rate.

Fares Lowered.—The Rockford & Interurban Railway, Rockford, Ill., recently put into effect reductions of nearly 20 per cent in its fares under authority of the State Commerce Commission. The reductions include round-trip fares on Saturday and Sunday. Fares on connecting lines will not be changed nor will fares in the suburban districts.

Service Changes Announced. — Since the discontinuance of service by the Charleston Isle of Palms Traction Company, Charleston, S. C., the railway on Sullivan's Island and also on Mount Pleasant has been operated by the Mount Pleasant Railway, which bought in the Charleston Isle of Palms property when it failed. As soon as the bridge across Cove Inlet is completed cars will be operated from the ferry wharf on Mount Pleasant through Sullivan's Island to Breach Inlet.

Dollar Pass to Popularize Cars.—The Pacific Gas & Electric Company has put the $1 pass into effect in Sacramento, Cal., in the hope of increasing earnings. For some years now the company has earned no return on the value fixed by the State Railroad Commission. The Merchants' Association has commended the action of the railway.

Fares Cut.—Summer schedules and rates of fare on the Cœur d'Alene and Opportunity-Vera lines of the Spokane & Eastern Railway & Power Company, Spokane, Wash., were arranged recently at a conference of traffic and operating heads presided over by Waldo G. Paine, vice-president and general manager. The new fare schedule provides for week-end rates to be good going on Friday, Saturday and Sunday instead of on Saturday and Sunday. The return limit will be good until Monday. A reduction in one-way fares of 20 per cent for parties of ten or more is announced. This will be effective on the lines of the Inland Empire Railway as well as the Spokane & Eastern.

Agreement Terminated. — The Spokane United Railways, Spokane, Wash., is now ending its three-year "gentlemen's agreement" with the city. This provided a 7-cent cash fare and 6-cent ticket rate. The present arrangement expires on July 1. No announcement has been made by the railway officials on the fare situation.

Councilmen Hard Put for Things to Criticise.—Arguments advanced by the Louisville Railway, Louisville, Ky., for some weeks past for a 7-cent straight fare, instead of five tickets for 30 cents have spurred the City Council to go over a report made by the City Utilities Bureau. Baffled to find any real reason for complaint against the company, the Councilmen have sought to attract attention to themselves by criticising expenditures made for traveling, attending conventions, supplying autos to officials. As for the buses operated by the Kentucky Carriers, Inc., it is sought to establish the principle that the losses sustained in their operation should not be charged to the barometer fund of the company.

Permit Given for Selling Merchandise.—The New York Transit Commission recently approved applications by the Interborough Rapid Transit Company, New York, N. Y., and the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., for permission to sell candy, gum and other merchandise in the city's newer subways. The privilege is expected to add about $150,000 a year to the revenues of each company. The action of the commission was taken under the provisions of the Nicoll-Clayton act, passed by the last Legislature and signed by Governor Smith. This eliminated from the rapid transit act the clause prohibiting the sale of anything but newspapers and the display of any advertising in the stations of the subways built under the dual contracts. The commission reserved the right of revocation and specified that vending might be carried on only under commission regulations.

Seek Increase—Reject Offer. — Employees of the Community Traction Company, Toledo, Ohio, have asked for an advance of 10 cents an hour. A counter-proposal of the company was that last year's wages be continued; this scale is 55 cents an hour for platform men on two-man cars and 60 cents an hour for the operators of one-man cars. The 1924 agreement with the company expired on June 1.

Financial and Corporate

Creditors in St. Louis Decline Fifty per Cent Offer

Creditors of the United Railways, St. Louis, Mo., who received judgment against the company prior to its receivership but who have not yet been paid, declined on May 29 to accept a 50 per cent settlement offer tendered by the reorganization committee. The reorganizers, through their counsel, Stanley Clarke, offered to pay the old judgment holders 50 cents on the dollar for the face of their judgment and also 50 per cent of the accrued interest. This offer was submitted in writing to a committee of lawyers representing the various creditors. The question of filing intervening petitions in the United States District Court was also discussed at the meeting. It was finally decided to appoint a committee to call on the various judgment creditors to obtain subscriptions toward defraying the cost of filing an intervening petition. Damage judgments approximating $375,000 are pending against the old United Railways.

Spokane Power Station Sold

Sale of the Nine-Mile power station, located on the Spokane River below the city of Spokane, by the Spokane & Eastern Railway & Power Company to the Washington Water Power Company of Spokane was announced on May 27. The transaction is the second large sale made by the bondholders of the old "Inland" system in recent years in the policy of disposing of properties of the former light and power system. The city lines of the old "Inland" were merged with the city railway system of the Washington Water Power Company in 1922, out of which the Spokane United Railways was formed. The power station supplied a portion of the new "United" system and all of the interurban lines. It has 20,000 hp. installed, consisting of four 5,000 hp. generators. The Washington Water Power Company has entered into a long-time contract to supply the interurban lines. Of the former "Inland" system only the interurban line, extending from Spokane to Cœur d'Alene, Idaho and a line through the Palouse wheat district to Moscow, Idaho, now remain. It is understood that those lines will eventually be sold by the bondholders. for whom the Harris Saving & Trust Bank, Chicago, is trustee.

New York Railways Would Trade with Ninth Avenue Company

The New York Transit Commission held a hearing on May 20 on the New York Railways Corporation's application for permission to exchange $1,250,000 of its 6 per cent income bonds and 7,500 preferred shares of no par value for $3.000,000 in bonds of the Columbus & Ninth Avenue Railway. The holders of two-thirds of the bonds have agreed to the exchange, it was disclosed.

Commissioner John F. O'Ryan asked what would be the status of the owners of the remaining bonds if they did not agree to the exchange. He was informed that they would be total losers. Under the reorganization plan the bonds must be deposited on or before June 15.

The Columbus Avenue line runs from Fifty-ninth Street to 110th Street, New York City. It is regarded as an important link in the recently reorganized surface railway system. A group of bondholders, it was said, would be unlikely to agree to the reorganization plan because they would prefer to abandon the surface tracks and rely on the sale of their carhouse rights and duct franchise for reimbursement.

The replacement value of the Columbus Avenue railroad property, not including equipment, on Aug. 1, 1923, was estimated at $2,252,450 by Stone & Webster, engineers, at the hearing on the application of the New York Railways for permission to acquire the Columbus and Ninth Avenue line.

Reorganization Terms Announced for Kansas City

Bonded Indebtedness of Street Railway Is Slashed to an Initial Issue of $12,465,200 at 6 per Cent in a Reorganization Plan Made Public June 1—Old Stockholders Not to Participate

AFTER deliberations extending over a period of many months the terms have been announced under which it is proposed to carry out the reorganization of the Kansas City Railways. The details were made public on June 1. The holders of the old preferred and the common stocks will not participate. A problem that still remains unsettled is the extent of the participation, if any, of the second mortgage bondholders and of J. Ogden Armour, with a claim of $1,500,000 for moneys advanced prior to the receivership. Stripped of the verbiage of the official document the plan has been reduced to this statement of fact:

PROPOSED IMMEDIATE CAPITAL DISTRIBUTION

Bonds, $12,465,200.
Preferred stock, $8,336,400.
Common stock, 182,645 shares of no par value.
Provisions for capital expansion: The first issue of bonds is not to exceed $20,000,000, of which at least $5,000,000 is to be held for property additions. A "prior preferred stock" may be issued later, but not in the reorganization.
Annual interest charge on bonds, $747,912.
Annual dividend required on preferred stock, $583,348.
Annual interest and dividend payments to be satisfied before common stock could enjoy dividends, $1,331,260.
Annual interest before receivership, $1,422,370.
New money to be invested, none.
Cash in receivers' treasury to be acquired by reorganizers (estimated), $5,000,000.

DISPOSITION OF TREASURY CASH

Course of treasury balance, surplus arising from 7, 7½ and 8-cent fare over a period in which no interest has been paid.
Settlements with injury claimants and lawyers, $1,350,000.
For working capital, reorganization expense and improvements, $3,650,000.

PREVIOUS LINE-UP OF SECURITIES

Face value of bonds and notes held by first mortgage interests in old company, $25,067,400.
Face value of securities (bonds and preferred stock) to be held by same interests in new company. $20,801,600. (This includes $1,350,000 in bonds to apply on a compromise with damage claimants.)
And in addition 182,645 shares of common stock.
Low ebb value (three and one-half years ago) of securities held by first mortgage interests, $7,500,000.

INTERESTS TAKEN CARE OF IN REORGANIZATION PLAN

First mortgage bond and noteholders; injury litigants and lawyers.

Interests which spurned a compromise offer, but may still be taken into the reorganization: Second mortgage bondholders; J. Ogden Armour.

PROPOSED DISTRIBUTION OF NEW SECURITIES

To holders of old first mortgage 5 per cent bonds, for each $1,000 bond, $400 in new 6 per cent bonds, plus $300 in preferred stock, plus seven shares of common stock.
(Of above bonds outstanding, $15,917,400.)
To holders of 7 per cent collateral notes, for each $1,000 note, $521.60 in new 6 per cent bonds, plus $391.20 in preferred stock, plus 7.824 shares of preferred stock.
(Of above notes outstanding, $7,750,000.)
Other noteholders, representing $1,400,000, to share in about same proportion.
To damage suit lawyers and their clients, $1,350,000 in cash and an equal amount in new 6 per cent bonds.

The new plan is being submitted to individual first mortgage bondholders and to noteholders by the reorganization committee, Melvin A. Traylor, H. L. Stuart, George W. Davison, P. W. Goebel, and J. K. Newman, the latter virtually occupying the position of reorganization manager in recent months. The plan provides for $12,465,200 in bonds as against $16,433,400 in a tentative plan that was drafted about a year ago.

The plan made public on June 1 is tentative in that it must be preceded by a foreclosure sale of the property and possibly may require the approval of Judge Kimbrough Stone. Foreclosure of the property has been ordered by the court with jurisdiction in the case, but the date of sale has not been advertised.

MAY COMPROMISE ON SECOND MORTGAGE

The termination of the receivership and the reorganization of the property as indicated faces an obstacle, in time at least, in the hostility of the second mortgage bondho'ders and of J. Ogden Armour. The latter is willing to lose his stock investment, but is striving to recover some part of the $1,500,000 advanced in a vain effort to ward off a receivership. These interests rejected a proffered compromise. The plan specifically authorizes the reorganizers to terminate this legal controversy, if they desire. Authority is given to make a settlement, if deemed satis-

factory, in bonds, stock or the proceeds of a sale of either. This may mean a further enlargement of the capital issue.

The plan gives the reorganization committee power to bring Kansas City business interests into a minority ownership of the property. For six months after the reorganization, the committee can sell 20 per cent or less of the stock of the company to employees or to residents of Greater Kansas City at a price to be fixed by the committee. Any bondholder, however, can withdraw his individual shares from participation in such sales.

$557,243 Profit at Seattle

Municipal Railway Operation in 1924 Results in Much Better Showing than Was Made in 1923—Statistics of Operation Unusually Complete

FIGURES of earnings of the Seattle Municipal Railway, Seattle, Wash., for 1924 show that the road did much better last year than it did in 1923. Net income in 1924 was $557,243, compared with $169,636 in 1923. The report was transmitted to the Mayor and the City Council on March 30, 1925, by D. W. Henderson, general superintendent of railways, but has just been made public in pamphlet form.

The report follows previous statements in its form. There is no running comment and except for the chronology the report is devoid of text to accompany the many tables of statistics that are included.

One thing appears quite certain. Seattle has at last hit upon a productive rate of fare. It is true that a campaign is on to stimulate riding, but under the 10-cent cash fare with three tokens for 25 cents the results have not been at all bad. Passenger revenue last year was $6,083,238, compared with $5,643,088 in 1923, and revenue per pay passenger went from 7.2780 cents in 1923 to 8.2387 in 1924.

Rates of Fare

Here is how Seattle has experimented with rates in the past:

May 9, 1914—Cash 5 cents; six tickets for 25 cents; 25 tickets for $1. Extra fare required on Lake Burien line outside city limits, or sixteen tickets for $1 good for full trip.

April 1, 1919—4⅓-cent and 6¼-cent tickets eliminated.

July 24, 1920—Cash fare, 10 cents. Token fare, 6¼ cents.

Jan. 9, 1921—Cash fare, 10 cents. Token fare, 8⅓ cents.

March 1, 1923—Cash fare, 5 cents. Transfers, 2 cents. Tokens, four for 25 cents good for fare with transfer.

INCOME STATEMENT, SEATTLE MUNICIPAL STREET RAILWAY

	1924	1923
Operating revenues	$6,119,290	$5,690,598
Operating expenses	4,807,538	4,716,106
Operating income	$1,311,752	$974,492
Miscellaneous revenue	54,616	813
Gross income	$1,366,368	$973,678
Deductions from gross income	809,124	804,042
Net income	$557,244	$169,636

Profit and Loss

Losses accrued (other than income) current annual period		$11,527
Delayed losses accrued in prior periods:		
Cost of retiring plant	$12,642	
Plant retired—depreciation not fully accounted	184,463	
Additional cost of industrial insurance	613	
Adjustment of accounts receivable	777	
Material out of stores	229	198,726
		$210,253
Net income (profit and loss—1924)		369,430
		$579,683
Net income		557,243
Gains accrued (other than income) current annual period		2,602
Delayed gains accrued in prior periods		19,838
		$579,683

CONDENSED BALANCE SHEET OF SEATTLE MUNICIPAL STREET RAILWAY AS OF DEC. 31, 1924

Capital Assets

Total capital assets	$13,893,167
Total redemption and special fund assets	648,609
Total current assets	1,144,503
Total deferred charges	67,813
Deficit—Dec. 31, 1924	615,928
	$16,370,022

Capital Liabilities

Bonds outstanding:	
General lien bonds	$775,000
Utility revenue bonds	14,191,000
Total capital liabilities	$14,966,000

Redemption and Sinking Fund Liabilities

Unmatured accrued interest on funded debt:		
General lien bonds	$7,812	
Utility revenue bonds	236,683	
		$244,495
Matured unpaid interest on funded debt		3,572
Depreciation reserve fund audited and approved claims payable		16,261
Matured unpaid bonds		450
Total redemption and sinking fund liabilities		$264,779

Current Liabilities

Amounts payable by current (operating) fund to other funds:		
To general fund	$249,237	
To Municipal Street Railway betterment fund	145,000	
To Municipal Railway bond 1919 construction fund	82,000	
To railway department depreciation reserve fund	90,000	
		$566,237
Amounts reserved on contractor's estimates		4,290
Tokens outstanding		73,157
Audited and approved claims payable		254,850
Warrants outstanding		240,706
Total current liabilities		$1,139,242
		$16,370,022

STATISTICAL AND COMPARATIVE REPORT OF OPERATION OF THE SEATTLE MUNICIPAL STREET RAILWAY

	1924			1923		
Revenue—Operating	Amount	Per Car-Mile (Cts.)	Per Car-Hour (Cts.)	Amount	Per Car-Mile (Cts.)	Per Car Hour (Cts.)
Passenger car revenue	$6,043,981	37.08	343.29	$5,613,545	34.70	318.43
Special passenger car revenue	593	0	.03	651	0	.04
Automobile bus revenue	38,662	.24	2.20	29,543	.18	1.68
Municipal department passenger revenue	48,000	.29	2.73	48,000	.30	2.72
Freight revenue	29,621	.18	1.68	36,510	.23	2.07
Mail revenue	19,395	.13	1.10	17,643	.11	1.00
Miscellaneous transportation revenue	12	0	0	.....	.....	.....
Discounts and adjustments	*60,976*	*.37*	*3.46*	*55,295*	*.34*	*3.14*
Total operating revenue	$6,119,290	37.55	347.57	$5,690,598	35.18	322.80
Miscellaneous Revenues and Expenses						
General shops	*40,086*	*.25*	*2.28*	*38,162*	*.24*	*2.16*
Service equipment	*2,351*	*.01*	*.13*	*13,388*	*.08*	*.76*
Utility equipment	*182*	*0*	*.01*	*605*	*0*	*.03*
Electric current sold	946	.01	.05	464	0	.03
Rental of real estate and buildings	4,024	.02	.23	4,213	.03	.24
Rental of tracks and way facilities	23,892	.15	1.36	24,563	.15	1.37
Rental of transportation equipment	1,578	.01	.09	1,383	.01	.08
Station and car privileges	22,335	.13	1.27	18,162	.11	1.03
Lost and found department	*296*	*0*	*.02*	*207*	*0*	*.01*
Other miscellaneous revenue and expenses	1,840	.01	.10	2,763	.02	.16
Total miscellaneous revenue	11,699	.07	.66	813	0	.05
Total gross revenues	$6,130,989	37.62	348.23	$5,689,784	35.18	322.75
Summary of Operation						
Way and way structures	459,717	2.82	26.11	411,365	2.54	23.33
Conducting transportation	2,022,303	12.41	114.86	2,015,645	12.46	114.34
Maintenance of transportation equipment	455,935	2.80	25.90	387,492	2.40	21.98
Housing and hostling transportation equipment	206,294	1.27	11.72	185,308	1.15	10.51
Power	624,815	3.83	35.49	634,724	3.92	36.00
Commercial	53,472	.33	3.04	60,820	.38	3.45
General	299,885	1.84	17.03	335,636	2.07	19.04
Depreciation and amortization	685,114	4.20	38.91	685,114	4.24	38.87
Total operating expenses	$4,807,538	29.50	273.06	$4,716,106	29.16	267.52

INCOME STATEMENT

	Current Year		Previous Year	
	Dr.	Cr.	Dr.	Cr.
Operating revenues	.....	$6,119,290	.....	$5,690,598
Operating expenses	$4,807,538		$4,716,106	
Operating income	.....	1,311,751	.....	974,497
Miscellaneous revenues and expenses	.....	11,699	813	..
Gross income	.....	1,323,450	.....	973,678
Deductions from gross income	766,207	.....	804,042	.....
Net income	.....	557,243	.....	169,636

PAYROLLS AND VACATIONS 1924

Transportation:	Payrolls	Cost of Vacations
Office, inspectors, station masters	$107,539	$3,705
Trainmen	1,977,672	78,164
Shops and carhouses	544,631	6,855
Way and structures	497,712	18,651
Accounting	86,238	3,585
Total	$3,213,794	$110,961

SEGREGATION OF PASSENGER CAR-HOURS AND CAR-MILES

	Car-Hours	Car-Miles
One-man single truck	176,253	1,375,666
One-man double truck	636,066	6,185,501
Two-man	884,737	8,235,147
Buses	43,542	414,720
Total	1,740,598	16,211,034

OPERATING STATISTICS OF THE SEATTLE MUNICIPAL STREET RAILWAY

	1924	1923
Car-miles operated	15,883,567	15,867,104
Car-hours operated	1,717,052	1,730,174
Bus-miles operated	414,720	306,499
Bus-hours operated	43,542	32,725
Total car-miles	16,298,287	16,173,603
Total car-hours	1,760,594	1,762,899
Average speed	9.26	9.17
P. S. E. transfers	7,063	9,437
S. & R. V. transfers	882,738	799,233
Jitney transfers	414,798	334,390
Passengers at 2½ cents	2,151,501	2,009,082
Passengers at 3 cents	58,078	59,769
Passengers at 5 cents	0	20,416,895
Passengers at 6½ cents	0	3,541,042
Passengers at 8⅓ cents	66,060,792	47,311,552
Passengers at 10 cents	4,841,895	3,699,648
Total pay passengers	74,416,865	78,181,048
Deadheads	1,152,735	1,282,266
Transfers	18,697,374	18,500,376
Total passengers	94,266,974	97,963,690
Pay passengers per car-mile	4.5659	4.8339
Total passengers per car-mile	6.0570	5.7839
Total passengers per car-hour	53.5427	55.5697
Passenger revenue	$6,083,238.19	$5,643,088.51
Miscellaneous revenue	47,751.16	46,696.43
Gross revenue	6,130,989.35	5,689,784.94
Revenue per car-mile	0.376174	0.351794
Revenue per pay passenger	0.082387	0.072780
Revenue per total passenger	0.065039	0.058081
Expenses, including depreciation	$4,807,538.52	$4,716,106.54

June 16, 1923—Cash fare, 10 cents. Token fare, 8⅓ cents. Transfers free.

Total gross revenue in 1924 was $6,130,989, compared with $5,689,784 in 1923, an increase of 7.75 per cent. Operating expenses, including depreciation, were $4,807,538 in 1924, compared with $4,716,106 in 1923, an increase of only 1.94 per cent. Except on five lines revenue exceeded expenses.

The number of employees was 1842, of whom 1,173 were trainmen, receiving 56 to 71 cents an hour. Twenty-two inspectors, instructors and station masters received $165 to $175 a month. Vacations for the employees cost the railway $110,961 out of a payroll of $3,213,794, or 3.4 per cent.

Accidents continue to be a source of concern. They totaled 5,207 in 1924, compared with 4,627 in 1923 and 3,989 in 1922. The cost of the injuries and damages account was $69,869 in 1924, compared with $81,708 in 1923 and $37,368 in 1922. In 1924 there were 240 step accidents on standing cars, compared with 225 the previous year, and 85 step accidents on moving cars, compared with 73 the previous year.

President Testifies on Valuation Issue

The fourth week in the hearing to place a valuation on the property of the United Railways & Electric Company, Baltimore, which is being conducted before the Maryland Public Service Commission, witnessed the appearance of Charles D. Emmons, president of the company. In his testimony Mr. Emmons said that at least $85,000,000 was a fair valuation of the property. The question of easements is expected to be one of the points to be fought with considerable energy on the part of Clarence W. Miles, people's counsel. The company also expects to complete its side of the case in the near future, including testimony dealing with the proposed $1 unlimited weekly pass. The company was ordered to present its side on the unlimited weekly pass following the filing of a petition.

The Great American Pyramids

Long denied what was justly due to them during the war-time period the utilities, particularly the light and power utilities, are coming into their own on the earnings side. This has been reflected market-wise in advances in quotations for the common stock of some of the companies that have attracted a big following from the public. On the other hand, several warnings have recently been sounded. For instance an article, "The Great American Pyramids," in *Barron's* for May 25 said that with its rates restricted to levels which will produce no more than a fair return it would seem that the speculative opportunities in stocks of the electrical utilities would not be large, but it said that the recent stock market activity of the stocks of some leading utilities is in striking contrast with this supposition. As indicative of some of the advances which have occurred in leading utility stocks in the past few years that paper cited the following:

Stock	1925 High	1921 Low	Per Cent Advance
American Water Works & Electric	317½	4	7,837
Middle West Utilities	102¾	13	690
Stand. Gas & Electric	54⅞	7⅞	631
Am. Pwr. & Lt.	727⅝	54	1,247
Commonwealth Power	182¾	10	1,727

The figure given as the 1925 high for three of these stocks is not the actual high for the year to date, but is adjusted to give effect to capital readjustments which have been made since the 1921 low point was reached.

This authority says that the explanation of the extraordinary contrast between these figures and the theoretical supposition that utility securities offer little opportunity for speculative profit is simply the result of successful trading on the equity.

The relationship between capital structure and price movements is well illustrated by the market action of the stocks of the five leading independent electric utility companies of the country during the past four years. The group includes Brooklyn Edison, Commonwealth Edison, Detroit Edison, Edison Electric of Boston and Philadelphia Electric. The capital structure of Brooklyn Edison as of Dec. 31 last is typical of the group. It included $45,696,000 funded debt and $59,754,000 capital stock of one class. The following table indicates the comparatively moderate advance which has occurred in stocks of this type:

Stock	1925 High	1921 Low	Per Cent Advance
Brooklyn Edison	140	88	59
Commonwealth Edison	139	101½	37
Detroit Edison	124¼	88	41
Edison Elec., Boston	214	142¼	50
Philadelphia Electric	45⅞	21	118

As *Barron's* sees it, a comparison of this table with the previous table of the market movement of leading holding company stocks suggests the advantages of doing business on a shoestring, relatively speaking, when the trend is in the right direction. This note of warning, however, is sounded:

> How far may such a movement as has occurred in public utility holding company stocks in the last four years be expected to go? Regulatory commissions are not likely to permit utility companies to earn much more than an 8 per cent return on capital investment as a general rule. The process of pyramiding cannot with impunity be carried to the limit. Investors with good memories may remember the fate of the Rock Island Company and the Interborough Consolidated Corporation as horrible examples of "shoe-string" holding companies which fell upon evil days. A combination of increased operating costs and delay in granting rate increases would be disastrous to some public utility holding companies whose equities are particularly thin.

Scrapping of Equipment Misconstrued

Angles entirely unwarranted by the facts in the case have recently been given by the newspapers to the decision of the Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, to dismantle some 300 box cars. In fact, this decision on the part of the management has been made to appear as "another evidence of the decline of the railroad." It is no such thing. The decision of the management is not an unusual one. The cars in question have been written off. They were regarded as being beyond the stage where it would pay to expend any further sums in their rehabilitation. Such parts of the equipment as are worth salvaging will be redeemed.

This road has always done well financially and is doing so now. It is one of the most intensively developed short lines in the United States, exchanges equipment with the steam roads and routes its cars through to all parts of the country. The total mileage operated is 152, but the system, according to the latest official data, had more than 2,500 cars similar to the 300 now about to be scrapped in a proceeding that is neither new nor unusual except to the ill-informed.

Drum Organization Active at Detroit

A. L. Drum of A. L. Drum & Company, Chicago, Ill., has been engaged by the receivers of the Detroit United Railway as the executive manager to work for and with the receivers in laying out plans for the future operation of the D.U.R. properties. A complete survey of the D.U.R. system is being made.

Studies are also being made to determine changes to be made to improve service and better the railway company's financial condition. Certain changes in policy have become effective.

The receivers have filed in federal court a petition for permission to issue $1,600,000 of receivers' certificates. The date of hearing was set for June 8.

Deficit on Interborough for Ten Months.—Total revenue of the Interborough Rapid Transit Company, New York, from all sources for April, 1925, was $5,142,256. After allowing for all operating expenses, taxes and income deductions there was a balance of $95,344. The statement also shows figures for the ten months ended April 30, 1925. The total revenue from all sources was $48,953,481, an increase of $656,637 over the corresponding period ended April 30, 1924. This increase, however, was more than offset by increased taxes and income deductions, the latter due chiefly to higher Manhattan (Elevated) rental, which became effective on July 1, 1924, under the readjustment plan.

Operating expenses during the period were lower than in the corresponding period of last year, but there was a deficit of $33,848 for the first ten months of the current fiscal year.

Revenues Decrease.—Total operating revenues for the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., for 1924 were $3,477,052, a decrease of $423,990 compared with 1923. Operating expenses were $3,127,536. The assets were $31,703,077, an increase of $353,573 over 1923. The company's list of investments for the year shows $13,600 for the purchase of the Indiana Motor Transit Company.

Merger Planned.—The Central Hudson Gas & Electric Company has asked permission of the Public Service Commission to acquire all outstanding stock of the Citizens' Railroad, Light & Power Company and the outstanding stock and mortgage bonds of the Southern Dutchess Gas & Electric Company, and to merge these companies. It desires also to purchase the stock of the Fishkill Electric Railway.

Manhattan Dividend Payments Authorized.—At the regular meeting of the board of directors of the Interborough Rapid Transit Company, New York, on June 2, the quarterly installment of Manhattan Elevated Company rental, due July 1, 1925, at the rate of $1.25 per share, was authorized. Payment of the deferred quarterly installment due on Jan. 1, 1925, at the rate of $1.25 per share, was also authorized. Both payments will be made on July 1, 1925, to stockholders of record on June 15.

Sale of Land Approved.—Sale of the four parcels of land at North Warren and West Hanover Streets, Trenton, N. J., by the Trenton & Princeton Traction Company has been approved by the Board of Public Utility Commissioners. The sale price was $85,000. The commission found that three of the properties involved were not needed for railway purposes. In the fourth instance the board's approval was given with the proviso that the Trenton & Princeton Traction Company and the New Jersey & Pennsylvania Railway be allowed by the new owner to use the land as a terminal.

More Valuation Evidence at St. Paul.—Supplemental evidence in regard to valuation of the properties and operating expenses of the St. Paul City Railway and the Minneapolis Street Railway, operating in St. Paul and Minneapolis, Minn., were to be admitted at the conference of the railway's representatives, the two cities and the Railroad and Warehouse Commission on June 1. The valuations of the two companies as given out by the commission two months ago was for 1922 in Minneapolis and 1924 in St. Paul. These may be brought up to date. Proponents of the plan to restore the neutral zone in St. Paul, abolished Jan. 7, 1922, with one fare to and from either city will be heard. The proceedings have to do with the determination of a permanent fare in the two cities based on a valuation of the properties. The rate is now 6 cents by arrangement with the Councils of the two cities. The companies are now in the jurisdiction of the State Railroad and Warehouse Commission.

Legal Notes

FEDERAL DISTRICT COURT.—*Trade Union Enjoined from Conspiracy to Obstruct Interstate Commerce.*

An injunction will lie to restrain employees of a telegraph company engaged in interstate business from conspiring to prevent it from performing its contracts by compelling it to discharge its employees who are not members of labor unions with which the defendant employees are affiliated. While an employee has a right to cease work, the cessation of work may be an affirmative step in an unlawful plan. One may not accept employment intending thereby to quit work when that act will enable him to perform one step in a criminal conspiracy. (Western Union Tel. Co. vs. International B. of E. W. 2 Fed. (Second) Rep., 993.)

FEDERAL SUPREME COURT.—*Commission Order Invalid When Confiscatory.*

Where the rates found by a regulatory body to be compensatory are attacked as being confiscatory, the court may inquire into the method by which the conclusion of the regulatory body was reached and may grant relief where the order was based on evidence which does not support the conclusions. The fact that the regulatory body issued the order for an experimental period does not alter its invalidity where the railroad's evidence tended to show that the existing rates, though higher than those fixed by the order, were confiscatory. (Northern Pacific Ry. et al. vs. Department of Public Works of Washington et al., 45 Supreme Court Rep., 412.)

MISSOURI.—*Humanitarian Rule as Applied to Infants.*

A child less than four years of age is in law incapable of contributory negligence, and in the application of the humanitarian rule, such a child is conclusively presumed to be oblivious of certain peril. (Moll vs. Wells, 270 Southwest Rep., 154.)

MISSOURI.—*Slippery Road No Excuse to Driver Operating Automobile at High Speed.*

In his opening statement, counsel for the plaintiff, the driver of an automobile, said his client saw the approaching street car when both were about 75 ft. away from the point where later the collision occurred, and that he tried to stop his automobile, but it skidded on the icy pavement and ran into the car. He claimed the car exceeded its lawful speed. The Supreme Court held that with this admission the Trial Court was warranted in closing the case at once and giving judgment to the defendant. (Wood vs. Wells, 270 Southwest Rep., 332.)

NEW HAMPSHIRE—*Part of Maintenance of Bridge over Steam Railroad May Be Placed on Street Railway Using Bridge.*

Under the New Hampshire law, a steam railroad must maintain the highway bridges over its tracks, and street railways are not allowed to use such bridges without the authority of the Public Service Commission. This case was in regard to the maintenance of a bridge over the tracks of the Boston & Maine Railroad, the bridge being used by a street railway which had not obtained the consent of the Public Service Commission to do so. It had, however, an agreement with the city for the use of the bridge. The court held that the primary duty of maintaining the bridge rests upon the steam railroad, but that the Public Service Commission may require the electric railway to pay any added expense made necessary by its use of the bridge. [City of Laconia vs. Boston & M. R.R. et al., 128 Atlantic Rep., 350.]

NEW JERSEY.—*Degree of Care Required at Passenger Station.*

While a common carrier of passengers must exercise a high degree of care as to its speeds and modes of conveyance of passengers, it is obliged to exercise only ordinary or reasonable care in the construction and maintenance of its station buildings, platforms and approaches. Hence, an instruction by the trial judge that it was the duty of the company "to use a high degree of care that the station should remain reasonably safe," was erroneous and harmful. (Holtzman vs. H. & M. R., 128 Atlantic Rep., 623.)

NEW JERSEY. — *Presumption of Negligence.*

In this case a passenger was injured when a car-door closed prematurely. In affirming the judgment in favor of the plaintiff the court quoted with approval the decision in an earlier case which says in part: "where a passenger shows that he was injured through some defect in the appliances of the carrier, which might have been prevented by due care, the jury may infer negligence, unless the carrier proves that due care was exercised. This inference is a legal inference in the sense that it is permitted by law, but not in the sense that it is required by law." (McPherson vs. Hudson & M. R., 128 Atlantic Rep., 231.)

NEW YORK—*Employee of One of Several Associated Lines Not an Employee of the Others.*

Ten railways, forming part of the Third Avenue Railway System, maintain jointly one employment bureau and school for instruction, from which men are sent sometimes to one line and sometimes to another of the associated group, or they may be transferred from one road to another. An employee of one of these lines was injured by a car of another line, and the company claimed that he was injured by a fellow servant and his only remedy was under the Workmen's Compensation Act. This plea was denied by the Court of Appeals. [Doran vs. New York City Interborough Railway, 147 Northeast Rep., 62.]

NEW YORK.—*Transportation of Passengers on Urban Line Not "Interstate Commerce."*

The International Railway operates all the street railways in Buffalo and has an interurban line to Niagara Falls and a connecting line running through Ontario to Queenstown, Ont. A trackman was killed while at work on one of the city lines in Buffalo, but the court held that he was not engaged in foreign commerce so as to make the company liable under the federal employers' act for his death. (Borelli vs. Internat. Ry. 127 Northeast Rep., 356.)

PENNSYLVANIA — *Truck Attempts to Beat Trolley Car at Crossing—Company Responsible.*

At a crossing on an interurban line, where the view was obscured, a truck with a number of workmen crossed in front of the trolley car. The driver and vehicle passed without collision, but several men in the truck jumped to escape injury and one was struck by the trolley car and was killed. The company and the driver of the truck were held jointly responsible. [Smith vs. Reading Transit & L. Co., 128 Atlantic Rep., 439.]

RHODE ISLAND.—*Position of Boarding Passenger When Car Starts.*

A street railway company does not have to wait until a passenger is seated until it starts a car, but only until the passenger has reached a position of safety. Hence, it was not negligent to start a car when a passenger had both feet placed solidly on the vestibule floor. (Straight vs. United Electric Rys., 128 Atlantic Rep., 571.)

WEST VIRGINIA.—*Eminent Domain for Transmission Line.*

A company operating an electric railway and also furnishing electric light, heat and power to commercial and industrial customers, is entitled to exercise eminent domain in the construction of transmission lines without obtaining a special permit from the Public Service Commission. (Monongahela-West Penn P. S. Co. vs. C. F. Cunningham Co., 127 Southeast Rep., 61.) (See also 127 S. E. Rep., 23.)

WEST VIRGINIA.—*Interurban Passenger Carried Beyond Destination Is Injured While Walking on Track.*

The plaintiff, a woman 52 years of age, and her married daughter, were carried a mile beyond their destination into a sparsely settled part of the city. They were directed to alight and come back on the next car, due in 15 minutes. It was about 9 p.m. Waiting for some time, they attempted to walk back on the track and fell off a trestle about 10 ft. high. Later they were picked up by an interurban car and taken home. Roads, safe and convenient for pedestrians, ran parallel to the track about a block away on each side, but the passengers were not aware of these roads. The Court of Appeals held that, as a matter of law, the plaintiff could not be held guilty of contributory negligence, preventing a recovery and declined to disturb a judgement for the plaintiff, awarded in the trial court. (White vs. Ohio Valley Electric Railway, 127 Southeast Rep., 56.)

Personal Items

Mr. Crawford Consultant

Well-Known Executive Establishes Himself in New York as Public Utility Expert

Norman McD. Crawford, formerly vice-president and treasurer of the Columbus Railway, Power & Light Company, Columbus, Ohio, has established himself in consulting practice at 95 Liberty Street, New York. He is prepared to act in public utility investigations and to report on financial, engineering and operating problems. Mr. Crawford left the company at Columbus in January last. He had anticipated taking things easy after a career of more than 40 years in public utility work. He did cut himself adrift from business for several months, but found idleness irksome. The necessity for him to be active does not exist, but he will undoubtedly be more than busy along lines of his own choosing

Norman McD. Crawford

Mr. Crawford's career in public utility work was reviewed briefly in the ELECTRIC RAILWAY JOURNAL for Jan. 31. Back of him there is a wealth of experience in practically all lines of electric public utility operation that makes it baffling to know just what to record and what to leave out in order to keep any record of his activities within bounds. Entirely aside from his managerial experience, this is not the first time that Mr. Crawford has engaged in consulting work. Way back in the early days of electric traction he had an engineering office in the World Building, New York, and in his capacity as engineer constructed the electric railway from Hartford to South Glastonbury, Conn. He also constructed the electric railway from Millville to Bridgeton, N. J., supervised the change in motive power from horse to electricity on the Jersey City-Bergen line and installed the Grand Avenue electric station in Jersey City. These are just a few of the things he did.

Later he was expert in connection with the Peoria, Ill., electrolysis case and the Dayton electrolysis case. As consulting engineer for the Connecticut Company he constructed the line from Hartford to Middletown. He was also tramway expert for the National Civic Federation in its investigating of public ownership and operation of tramways in England. Furthermore, he reported on the operation of the Second Avenue Railway in New York for the protective committee representing the bondholders.

Interlarded with this wide experience as a consulting engineer and expert Mr. Crawford served in various operating capacities, notably superintendent of the Meridan Horse Railroad, general manager of the Rochester Street Railway, general manager of the Hartford Street Railway, vice-president and general manager of the Ohio Electric Railway, president of the Mahoning & Shenango Railway, president of the Reading Transit & Light Company and vice-president and treasurer of the Columbus Railway, Light & Power Company.

This is a mere outline of the work of the man, but it does convey an idea of the wide range of his activities and the wealth of knowledge and experience at his command for application to such problems as may be brought before him in his present capacity of consulting engineer.

Officials of Public Service Bus Organization Reassigned

Changes in the duties of some of the employees of the Public Service Transportation Company, Newark, N. J., the bus operating subsidiary of the Public Service Railway, have been announced by Matthew R. Boylan, vice-president in charge of operation.

Fred M. Shipman, general superintendent of the auto maintenance department, is placed in full charge also of bus maintenance and repairs.

Frank P. Freeman is made assistant superintendent in charge of garages and servicing.

Howard G. Young becomes superintendent of shops and is stationed at the Irvington bus repair shop.

H. A. Benedict, mechanical engineer, will direct the work of handling the body repairs and painting.

Operating Managers Appointed for Long Island Lines

Gen. Lincoln C. Andrews, receiver, has announced that he has appointed the firm of Fisk & Roberts operating managers of the New York & Queens County Railway, the New York & Long Island Traction Company and the Long Island Electric Railway. In putting Fisk & Roberts in charge of the operation and rehabilitation of these New York City traction lines General Andrews was influenced in his choice by the previous record of the two members of the firm in public utility management and by his belief in the doctrine

that best results can be secured from the properly directed enthusiasm of young men who have everything to gain from successful accomplishment on their part.

The railways in General Andrews' charge operate more than 100 miles of track serving most of the Borough of Queens in the city of New York and the county of Nassau lying just over the city line. Announcement was made in the ELECTRIC RAILWAY JOURNAL of May 9 of the organization of Fisk & Roberts, with New York offices at 82 Beaver Street.

Changes in Southwest Personnel

Messrs. Clifford and Bradley in New Roles with Stone & Webster Organization

George H. Clifford, vice-president and general manager of the Northern Texas Traction Company, Fort Worth, Tex., winner of the Coffin award last year, brings a wealth of experience for application to his new position of southwestern district manager over all Stone & Webster properties in Texas, Louisiana and New Mexico. The properties involved embrace companies with many diversified interests, but Mr. Clifford's record with the Northern Texas Traction Company has proved that he has talents capable of wider application than was afforded in his work at Fort Worth.

Necessarily a man responsible for the operation of the property that carries off the coveted Coffin premium must have made a record that marks him apart from most other men in similar capacities. Competition for the Coffin award is keen. The prize goes to "that electric railway in the United States which during the year has made the greatest contribution toward increasing the advantages of electric transportation for the convenience and well-being of the public and for the benefit of the industry." And with the prize goes an unexpressed encomium to the manager of the property to which the award is made more far-reaching than any words of eulogy, however significant the terms in which they might be couched.

This man to whom promotion has now come more nearly in keeping with his talents was born at Fort Worth in 1881. He was graduated from the public schools and attended Weatherford College. After he left school he worked as a stenographer for several companies until 1901, when he entered the service of the Northern Texas Traction Company as secretary to F. M. Haines, general manager of the company, owned by the Bishop & Sherwin syndicate, Cleveland, Ohio. In 1903 Mr. Clifford was made secretary and treasurer of the company. This position he held until 1905, when the property was purchased by Stone & Webster of Boston, Mass. After the change in ownership he was made general superintendent. In 1910 he was elected vice-president and general manager of the Northern Texas Traction Company and in addition general manager of the Fort Worth Southern Traction Company, a 32-mile interurban line between Fort Worth and Cleburne, Tex., and the Arlington Light & Power Company, which is engaged in the water, light and ice business at Arlington, Tex.

Luke C. Bradley, succeeded by Mr. Clifford and now division manager in charge of the southeastern and southwestern districts for Stone & Webster with headquarters in Boston, was appointed district manager of the Stone & Webster properties in Texas in 1916. His service with Stone & Webster covers a period of 25 years. For the last 30 years he had been engaged in public utility work in responsible positions of an engineering and operating character throughout the United States. Mr. Bradley went to the gulf coast section of Texas in 1910 as vice-president of the Houston Electric Company, Galveston-Houston Electric Railway and Galveston Electric Company and manager of the two latter companies. In these capacities he was a constructive factor in the development of the Galveston-Houston territory. Early in 1913 he was appointed assistant district manager of the Stone & Webster properties in Texas, relieving Mr. Phinney of a large part of his duties as district manager. For a while the office was maintained in Dallas, but on account of its more centralized location with respect to the Stone & Webster properties headquarters were moved to Houston.

G. H. Clifford

L. C. Bradley

Obituary

B. S. Josselyn

Benage S. Josselyn, former president of the Portland Railway, Light & Power Company, now the Portland Electric Power Company, Portland, Ore., died on May 26.

He became president of the Portland Railway, Light & Power Company in 1907 and retained this position until 1913. Mr. Josselyn left school at the age of 14 and entered railroad service as a ticket clerk. He was identified at one time with the Kansas City, Osceola & Southern Railway, the Omaha & St. Louis and the Omaha, Kansas City & Eastern lines. During 1902 and 1903 he was general manager of the Hudson Valley Railway, Glens Falls, N. Y. Later he was general manager of the Union Terminal Railway in Sioux City and during 1906 and 1907 he was vice-president and general manager of the Maryland Telephone & Telegraph Company and the Baltimore Electric Power Company.

During the time he was president of the Portland property the River Plant at Estacada was built, the east side city line was rebuilt, several narrow-gage lines were changed to broad gage and many shops and carhouses were constructed.

L. C. Haynes

Louis C. Haynes, vice-president of the East St. Louis & Suburban Railway, East St. Louis, Ill., and associated properties, died at his home in St. Louis, Mo., on May 22. He was 73 years old and had been active until a few days prior to his death. Mr. Haynes had been connected with the railway system at East St. Louis since 1902. Prior to that he had been engaged in the real estate business in East St. Louis. About 50 years ago he went to St. Louis as a reporter for the St. Louis *Daily Journal*. He also served the *Daily Leader* of Cleveland for several years as a reporter and assistant city editor. When the *Journal* was purchased by the late Joseph Pulitzer of the *Post-Dispatch*, Mr. Haynes organized the Haynes Realty & Financial Company. In the year 1893 he became connected with E. W. Clarke & Company, Philadelphia, and was assigned to administrative duties with the East St. Louis properties of the Clarke firm in 1902. He was an extensive traveler and wrote a brochure of his experiences on a trip to the Holy Land several years ago.

T. A. H. Hay

Thomas A. H. Hay, for eight years secretary of the Easton Board of Trade, and pioneer in construction of electric interurban railroads in Easton, Pa., and vicinity, died on May 28 in a Philadelphia hospital, at the age of 69. He was a member of many organizations, including the Pennsylvania Society of New York and the Manhattan Club, and had been president of the Zeta Psi fraternity. His brother, W. O. Hay, is vice-president and general manager of the Northampton Transit Company, Easton.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Trade Statistics Not Illegal

Supreme Court Explains Status of Dissemination of Business Information —Holds Public Interests Served

A decision clarifying the legal view of trade association activities in gathering and distributing statistics was handed down by the United States Supreme Court on June 1 when decrees of lower courts enjoining the Maple Flooring Manufacturers' Association and the Cement Manufacturers' Protective Association under the Sherman anti-trust law were reversed. The decision was by a divided court, six to three. The majority opinion was delivered by Justice Stone, the newest member of the court, who, as Attorney-General, had given considerable study to the question of trade statistics at the request of the Department of Commerce.

Justice McReynolds entered a vigorous dissent in each of the two cases on the ground that the tendency of the activities complained of by the government clearly was to enrich the members of the associations by controlling production or prices or both to the detriment of the consumer. Chief Justice Taft and Justice Sanford dissented in each case on the ground that the evidence brought these cases within the rule laid down by the court previously in decisions sustaining decrees against the American Column & Lumber Company and the American Linseed Oil Company.

The majority opinion, however, holds that in these previous cases clear intent to evade the law was established, while in the cases at issue circumstances were different.

The principal decision was read in connection with the decree issued by the District Court in Michigan against the Maple Flooring Manufacturers' Association. The association operates principally in Michigan, Minnesota and Wisconsin. It gathered and distributed statistics of production, stocks, unfilled orders and average sales prices; it published a book giving railroad rates from Cadillac, Mich., to some 1,000 points in the country, and members held meetings where statistics and other matters were discussed. These things in themselves do not constitute restraint of trade, the majority opinion holds.

The Cement Manufacturers' Protective Association operated along similar lines of gathering and distributing information. In addition, in this case the question of distributing information regarding specific job contracts was involved. The government sued in the District Court of Southern New York for an injunction, alleging violation of the Sherman law, and was given a decree. Justice Stone, for the majority of the Supreme Court, predicated his opinion in the cement case on that in the flooring manufacturers' case, adding that information regarding specific job contracts was not violative of the law, because it had not been established that contractors suffered, but merely that the system protected manufacturers against contractors who might take advantage of such contracts for cement if the market was favorable.

After reciting the history of the case, the majority opinion in the flooring manufacturers' association case lays down broad principles in part as follows:

> It is not, we think, open to question that the dissemination of pertinent information concerning any trade or business tends to stabilize that trade or business and to produce uniformity of price and trade practice. Exchange of price quotations of market commodities tends to produce uniformity of prices in the markets of the world. Knowledge of the supplies of available merchandise tends to prevent over-production and to avoid the economic disturbances produced by business crises resulting from over-production. But the natural effect of the acquisition of wider and more scientific knowledge of business conditions on the minds of the individuals engaged in commerce and its consequent effect in stabilizing production and price can hardly be deemed a restaint of commerce or, if so, it cannot, we think, be said to be an unreasonable restraint, or in any respect unlawful.
>
> It is the consensus of opinion of economists and of many of the most important agencies of government that the public interest is served by the gathering and dissemination, in the widest possible manner, of information with respect to the production and distribution, cost and prices of actual sales of market commodities, because the making available of such information tends to stabilize trade and industry, to produce fairer price levels and to avoid the waste which inevitably attends the unintelligent conduct of economic enterprise. Free competition means a free and open market among both buyers and sellers for the sale and distribution of commodities. Competition does not become less free merely because the conduct of commercial operations becomes more intelligent through the free distribution of knowledge of all the essential factors entering into the commercial transaction. Restraint upon free competition begins when improper use is made of that information through any concerted action which operates to restrain the freedom of action of those who buy and sell.
>
> It was not the purpose or the intent of the Sherman anti-trust law to inhibit the intelligent conduct of business operations, nor do we conceive that its purpose was to suppress such influences as might affect the operations of interstate commerce through the application to them of the individual intelligence of those engaged in commerce, enlightened by accurate information as to the essential elements of the economics of a trade or business, however gathered or disseminated. Persons who unite in gathering and disseminating information in trade journals and statistical reports on industry; who gather and publish statistics as to the amount of production of commodities in interstate commerce, and who report market prices are not engaged in unlawful conspiracies in restraint of trade merely because the ultimate result of their efforts may be to stabilize prices or limit production through a better understanding of economic laws and a more general ability to conform to them, for the simple reason that the Sherman law neither repeals economic laws nor prohibits the gathering and dissemination of information. Sellers of any commodity who guide the daily conduct of their business on the basis of market reports would hardly be deemed to be conspirators engaged in restraint of interstate commerce.

The court ruled that such information gathered and disseminated among the members of a trade might be the basis of agreement or concerted action to lessen production arbitrarily or to raise prices beyond the levels of production and price which would prevail if no such agreement or concerted action ensued, and those engaged in commerce were left free to base individual initiative on full information of the essential elements of their business. Such concerted action constitutes a restraint of commerce and was illegal and might be enjoined as might any other combination or activity necessarily resulting in such concerted action as was the subject of consideration in American Column & Lumber Company vs. United States *supra* and United States vs. American Linseed Oil Company *supra*. But in the absence of proof of such agreement or concerted action under the present plan of operation of defendants no basis could be found in the gathering and dissemination of such information or in their activities under their present organization for the inference that such concerted action would necessarily result within the rule laid down in those cases.

Rubber Prices Rebound

Rubber at 70 cents gives new proof of the utter impossibility of controlling programs intended to restrict production. After having stated that they would be satisfied with 32 cents the British find that they are not able to augment production quickly when the need arises.

The high price may be worth enduring as it will boom rubber production outside of British possessions, it is pointed out. The weakness of any control of production is that it tends to stimulate production on one end and to restrict consumption on the other. Sooner or later this process breaks down the control. In the case of rubber, in addition to the increases of production in the Dutch possessions, which are pledged not to restrict production, and in other rubber-growing areas there will be larger resort to secondary supplies. The reclamation of rubber, which is done very successfully, is profitable when the price of the raw material is high.

It also is expected that present prices will reduce the rate of consumption very materially. Even in the case of a commodity such as coffee price increases reduce the amount used. The recent advance in the price of coffee is said to have discouraged consumption to the extent of 25 per cent.

Metal, Coal and Material Prices

Metals—New York	June 2, 1925
Copper, electrolytic, cents per lb	13.60
Copper wire base, cents per lb	15.875
Lead, cents per lb	8.425
Zinc, cents per lb	7.32
Tin, Straits, cents per lb	54.875
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.25
Somerset mine run, Boston, net tons	1.975
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	2.125
Central, Ill., screenings, Chicago, net tons	1.875
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N.Y., cents per lb.	17.85
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$1.09
White lead in oil (100-lb. keg), N. Y., cents per lb.	0.1575
Turpentine (bbl. lots), N. Y., per gal.	$1.01

Change in Status of Bureau of Mines

After mature consideration officials of the Department of Justice are understood to be of the opinion that there is no legal reason why the Bureau of Mines may not be transferred to the Department of Commerce. It was said in the ELECTRIC RAILWAY JOURNAL issue of April 4, page 567, that this transfer was expected.

The organic act of the Department of Commerce empowers the President to transfer to that department any scientific agency, outside the Department of Agriculture, that he may see fit. The Bureau of Mines was created after the Department of Commerce. For years there has been a question as to the application of the law to that particular bureau. The doubt now has been removed and it is assumed that the administration will indicate its faith in its own reorganization plan and make the transfer.

Rolling Stock

Key System Transit Company, Oakland, Cal., has been advised by the Board of Engineers, which has been conducting a traffic study of that property, to purchase 100 new cars over a period of three years. Of this number 30 are to be purchased at once.

Havana Electric Railway, Light & Power Company, Havana, Cuba, during 1924 built and equipped 50 new model passenger cars and reconstructed four old-type cars. The construction of 50 additional new cars was authorized, of which fifteen were begun. The new model bodies are lighter, stronger and more durable. They have seats for 36 passengers, against 32 for most of the old type, and the aisles and platforms are wider so they can accommodate more passengers and carry them more comfortably. The average weight of the new cars with modern motors is 17,500 lb. The older types weigh about 20,000 lb. The only important change in car body construction during the year was the substitution of riveted steel floor frames for the wood beam construction formerly used. The steel frames are lighter, cheaper and stronger.

Chicago & Joliet Electric Railway, Joliet, Ill., has purchased four Mack 25-passenger city-type buses to be placed in operation on city routes.

Department of Street Railways, Detroit, Mich., has received permission through the City Council to purchase ten Reo pay-enter buses.

Oklahoma Railway, Oklahoma City, Okla., has placed an order for three Reo pay-enter buses.

Track and Line

Seattle, Wash.—The City Council utilities committee recently took steps toward the extension of the Cowen Park line by recommending the passage of an ordinance which provides that $72,000 required to finance the extension be raised through sale of negotiable interest-bearing street railway department warrants. As proposed, a wooden trestle, 687 ft. long, will be constructed through Cowen Park and the railway tracks extended on Fifteenth Avenue from Ravenna Place to Victory Way.

Philadelphia Rapid Transit Company, Philadelphia, Pa., plans to make extensions by laying a single track on Venango Street between Twenty-second Street and a point near Twenty-third Street, and a single track on Hunting Park Avenue between Twenty-second Street and a point approximately 200 ft. east of the central line of Wissahickon Avenue. The Board of City Surveyors has approved the plans on the ground that the object of the new line was to facilitate the routing and handling of cars and to afford accommodations to the large number of persons employed in large industrial plants.

Municipal Railway of St. Petersburg, St. Petersburg, Fla., will soon complete its $200,000 railway improvement program. The double tracking of Second Street north from First to Fifth Avenues has been completed and workmen are paving between the tracks. Locust Street from Fifteenth to Twenty-first Avenue has also been completed. Work will be started about the end of July on Euclid Boulevard from Fifteenth Street to Thirty-fifth Street.

Los Angeles Railway, Los Angeles, Cal., has started work on the extension of Melrose Avenue from Normandie Avenue to Western. The company is also planning the Fifth Street extension to make that street a through street.

Trade Notes

American Manganese Steel Company, Chicago Heights, Ill., has placed in operation a new foundry at Los Angeles Cal., for the manufacture of Amsco steel casings. The new Los Angeles foundry is of steel construction throughout. The organization has facilities for producing about 25,000 tons of manganese steel casings annually.

Nugent Steel Castings Company, Chicago, Ill., manufacturer of small and thin section steel castings, has recently placed in operation an electric annealing furnace for the treatment, in this manner, of its entire product.

Moreland Motor Truck Company, Los Angeles, Cal., has just brought out a six-wheel truck suitable for handling materials used in truck and highway construction for transmitting coal. It is of 6-ton capacity and is equipped with a four-cylinder or six-cylinder engine, depending on the service to be given. It can be geared for a speed of 35 m.p.h. if desired. A special feature of the chassis construction is the use of six wheels.

Austin Company, Cleveland, Ohio, has been awarded a general contract covering the design, erection and equipment of the new plant of the G. A. Gray Company, Cincinnati, one of the largest manufacturers of steel planers. The new plant under construction in the Idlewild district will represent an investment of practically $1,000,000. The equipment installed under the Austin contract includes heating, lighting, plumbing, air and gas lines, electric equipment, sprinkler system, railroad trackage and boiler house equipment. The contract requires that construction work of the building be completed in 90 working days, with an additional 30 days for the installation of equipment. This will bring the Gray Company into complete possession of its new building in the fall of the year.

Conveyors Corporation of America, Chicago, Ill., announces that the Kent Engineering Company district representative has removed his office to 716-718 Builders Exchange Building, Minneoplis, Minn. The Kent Engineering Company handles the sale of American steam jet ash conveyors, airtight doors, ash gates and other power plant supplies in Minnesota and adjacent territory.

New Advertising Literature

Electric Railway Equipment Company, Cincinnati, Ohio, has issued a new catalogue of "Elreco Tubular Steel Pole Tables and Pole Fittings." Elreco pole table, giving weight, section lengths and deflection under various loads, are published in this pamphlet, "with the idea of assisting prospective customers or engineers to select without difficulty the size and weight pole most suitable for their particular conditions."

Conveyors Corporation of America, Chicago, Ill., has issued a folder called "American Air-Tight Doors." It discusses the air-tight door for ash-pits, boiler settings and other locations where an air-tight door is needed.

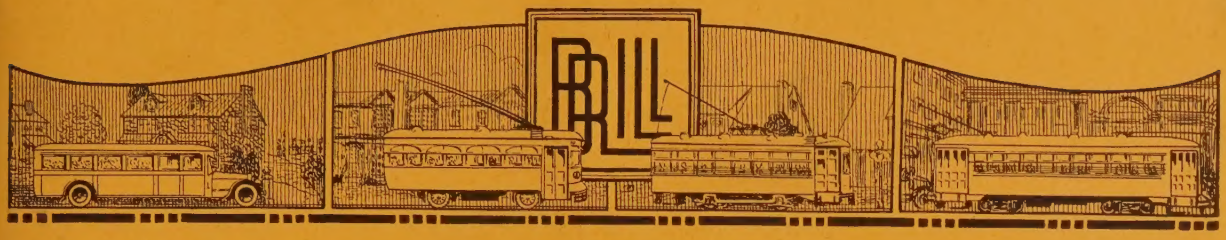
Electric Machinery Manufacturing Company, Minneapolis, Minn., has issued bulletin No. 799 on automatic starters for synchronous motors. This booklet is illustrated and contains a separate bulletin, No. 785A, dated November, 1924, listing some users of the Electric Machinery synchronous motors.

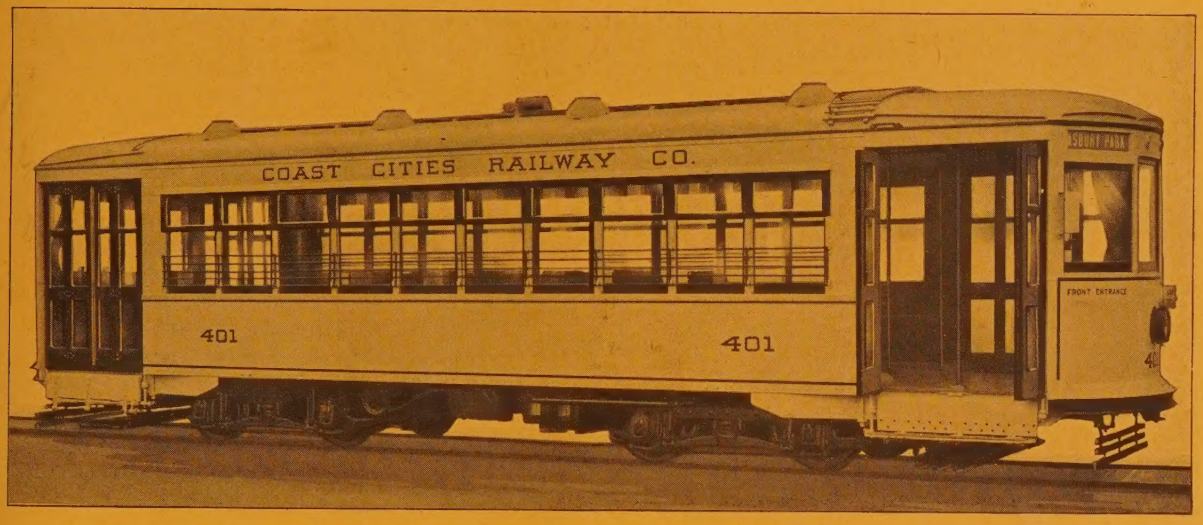
Roller-Smith Company, New York, N. Y., has issued two new bulletins on two new lines of apparatus. Bulletin 400 covers two lines of small direct-current panel type instruments. Supplement to Bulletin 530 describes the new non-closable on overload circuit breaker recently brought out by the company.

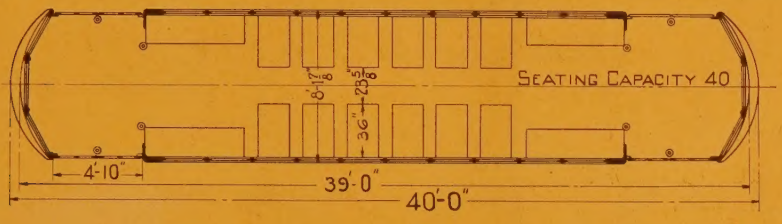
Cleveland Twist Drill Company, Cleveland, Ohio, has issued catalog No. 41, a 243-page pamphlet with index and illustrations showing all its regular tools and a few special tools. In this new catalog are found several new items, such as special drills for bakelite and slate, a new small jobbers' carbon drill set and a complete new section of mechanical data with useful information for shop men.

DeVilbiss Manufacturing Company, Toledo, Ohio, has issued a folder which describes the DeVilbiss spray-painting equipment necessary for doing refinishing work with pyroxylin finish or lacquer enamels.

Una Welding & Bonding Company, Cleveland, Ohio, has issued Bulletin No. 113, called "A Continuous Path of Copper from Rail to Rail."







Light-Weight
Double-End
Safety
One-Man Two-Man
Cars

Coast Cities Railway

Brill "Renitent" Posts

The seven new cars recently placed in service by the Coast Cities Railway between Asbury Park and Long Branch, N. J., are indicative of present-day tendency toward modernization.

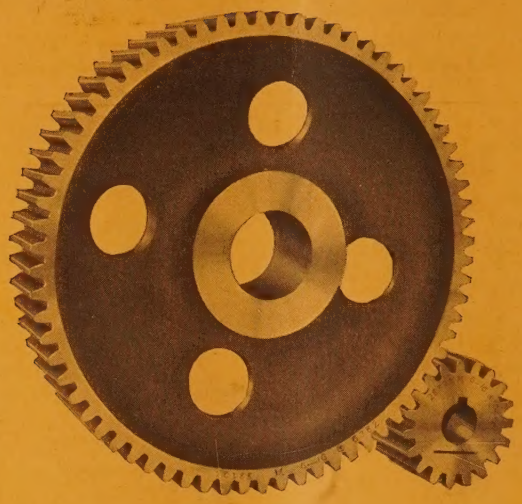
In design and equipment every facility is provided for the comfort and convenience of passengers. Seats are of the Brill "Winner" reversible type upholstered in brown imitation leather, and Brill "Renitent" spring-brass post casings hold lower sash under compression, thereby eliminating sash rattle, dust and rain.

Mounted on Brill low-level 77-EX trucks, equipped with 26-in. diameter wheels, and propelled by quadruple 35-Hp. motors, these cars weigh 35,226 lb. each.

Complete descriptions and illustrations in May, 1925 Brill Magazine

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. — ST. LOUIS, MO. — G. C. KUHLMAN CAR CO. — CLEVELAND, OHIO. — WASON MANF'G CO. — SPRINGFIELD, MASS.



1700 more Grade M's for Chicago

1700 Grade M Gears and Pinions constitute part of a recent order for G-E Gearing placed by the Chicago Surface Lines.

More than half the gears and pinions for the 1925 requirements of this road are made by General Electric.

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GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK